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Atlas of Western Surface-Mined Lands: Coal, Uranium, and Phosphate

NALCO Environmental Sciences, Northbrook, IL

Prepared for

Fish and Wildlife Service, Fort Collins, CO Western Energy and Land Use
Team

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ATLAS OF WESTERN SURFACE-MINED LANDS: Coal, Uranium and Phosphate



Interagency Energy-Environment Research and Development Program
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2. To gather, analyze, and present information that will aid decision-makers in the identification and resolution of problems associated with major land and water use changes.
3. To provide better ecological information and evaluation for Department of the Interior development programs, such as those relating to energy development.

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ATLAS OF WESTERN SURFACE-MINED LANDS:
COAL, URANIUM, AND PHOSPHATE

BY

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PREFACE

Personnel of the Terrestrial Ecology Section of NALCO Environmental Sciences were responsible for the data acquisition, analysis, presentation, and interpretation provided herein. Dr. A. K. Evans, Section Head, provided technical and operational direction of the project. Mr. P. Eby, currently with P. Eby and Associates Ltd. of Vancouver British Columbia, conducted the general and state information searches. Mr. E. W. Uhlemann, Plant Ecologist with the Terrestrial Ecology Section, and Dr. Evans conducted the various on-site visits. Other Terrestrial staff members that assisted Mr. Uhlemann and Dr. Evans in laboratory analysis and report preparation were Mr. J. L. Suchecki, Wildlife Ecology Group Leader, and Ms. J. M. Haynes. Ms. P. Parshall and Ms. N. B. Gara provided all cartography, and Ms. S. Pike assisted with information retrieval.

Many persons were contacted for a variety of information during the course of this inventory. The time and cooperation provided by government officials, mine owners, and mining-company personnel were essential to the success of this inventory. We are especially indebted to Mr. E. Nobel and Dr. P. Packer of the Intermountain Forest and Range Experiment Station, U.S. Forest Service, for their contribution of field data on many active mines throughout the west.

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I. INTRODUCTION

The increasing demand for energy has resulted in increased energy exploration and exploitation throughout the western United States. Much of the energy reserve is close to the surface and well suited to surface-mining methods of extraction. The problem of returning these lands to useful production, whether it be as wildlife habitat or agriculture, has yet to be successfully resolved. The problems inherent in reclaiming surface-mined lands are complicated by variations in such factors as climate, elevation, vegetation type and structure, water availability, terrain, and chemical composition of exposed spoils. Surface and ground water quality are also influenced by some or all of the above factors. In order to successfully re-establish viable terrestrial and aquatic life to surface-mined lands, detailed information concerning each mine's present and former ecosystem and various other characteristics is needed. In order to assess the potential for reclamation, detailed biological surveys must be made of selected orphaned and reclaimed surface-mined areas so that a data base can be established from which the impact of different mining and reclamation techniques can be predicted.

Specifically, this atlas is designed to fulfill the following objectives:

- 1) To assemble and consolidate available information on all coal, uranium, and phosphate surface mines in excess of 10 acres that were in operation prior to 1976 in the western 11 contiguous states plus North Dakota and South Dakota; and
- 2) To index and present these data in a fashion that will allow a systematic and comprehensive review of surface-mined lands so that appropriate areas can be selected for intensive biological assessment of natural and man-induced revegetation and refaunation.

To accomplish these objectives, available information has been obtained from state, federal, and industrial sources, and has been supplemented by onsite inspections of selected mining sites. For each identified mine, the following information has been obtained wherever possible:

- geographic location and locating instructions,
- operator and surface and subsurface ownership,
- summary of the mining plan and methods,
- summary of the reclamation plan and methods,
- dates of operation,
- area affected by mining activities,
- reclamation history, where applicable, and
- current land use and vegetation conditions.

The major problem in developing this inventory has been the fragmented and incomplete nature of data sources. In particular, reclamation histories for older mines in the western states are often sketchy or nonexistent. Jurisdiction for regulation of mining is, and has been, divided among numerous state and federal agencies. In recent years, most of the 13 western states have established surface-mine reclamation acts that require certain surface mines to prepare and submit detailed post-mining reclamation plans. These laws are all of recent origin and, in many cases, older mines are exempted from compliance due to "grandfather" clauses. Recent federal legislation will eventually bring all surface mining of coal under federal guidelines through state agreement programs, but other surface-mined commodities will not be included.

Although numerous studies have been undertaken on surface-mine reclamation, these studies have been site-specific and usually aimed at development of agricultural rather than natural systems. Mining industry publications indicate the number and production of mines by type and state, but they do not provide detailed information relevant to the ecological aspects of surface mining. The U.S. Geological Survey is preparing a comprehensive, computerized inventory of mine sites in the western states, but data are incomplete and the report is several years from completion. The U.S. Bureau of Mines is also producing an inventory of mined sites in the western states (47, 48); but, again, coverage is incomplete and often compiled from out-dated sources. Ecological information and data on reclamation are absent from both of these inventories. The U.S. Environmental Protection Agency is developing an inventory of producing surface coal mines (32); again, ecological information is sketchy and most mines are not included because of size and status. The Soil Conservation Service compiles data on total acreage disturbed by mining within each state, but information is not available on a mine-by-mine basis. A comprehensive analysis of ecological conditions on western mined lands is not available from any of these sources.

The inventory of western surface mining that is presented here was designed to consolidate those data relevant to the ecological history and current ecological condition of lands surface mined for coal, uranium, and phosphate in the West. The inventory should provide a broad data base for the future development of intensive onsite ecological research programs aimed at the reestablishment of viable ecosystems on western mined lands.

INVENTORY METHODS

The basic approach of the surface-mine inventory was to proceed from the general to the specific in identifying and describing the surface mines of the 13 western states. General

information sources were initially screened, including the following federal agencies: Geological Survey, Bureau of Mines, Bureau of Land Management, Forest Service, Soil Conservation Service, Environmental Protection Agency, Energy Research and Development Agency, and Bureau of Indian Affairs. A mine-information data sheet was filled out for each mine that might qualify for the Atlas based on the various lists, inventories, and files of these agencies. The Mineral Industry Locating System (47, 48) of the U.S. Bureau of Mines was used to provide initial location, name, and commodity for many mines. Since the utilization of all uranium resources fell under the jurisdiction of the Energy Research and Development Agency (ERDA), now within the Department of Energy, the files of that agency (65) within the office of Mr. W. L. Chenoweth (67) in Grand Junction, Colorado, provided the single most useful source of preliminary data for uranium mines. Similarly, since most western phosphate mines are located on federal lands, relatively complete information was available from the U.S. Geological Survey and from a recent environmental impact statement on the use of phosphate resources (143). Other than industry publications on active mines, no central source of data on coal mines was available because of the numerous federal and state agencies that have jurisdiction over coal resources.

The second phase of the inventory was to visit the various state agencies that compile data on mining. In most states the State Mine Inspector and State Geologist had some information on individual mines. Also, every state but Arizona has a reclamation act, and reclamation plans are thus available for operating coal mines through the various reclamation offices. Many data gaps concerning ownership, age size, and mining and reclamation plans were filled at the state level. Additionally, numerous inactive mines were located that had not been found in the general sources. It is important to note that much of the information on older mines came orally from interviews with persons that had worked in the states for many years, and cannot be found in any files or published sources. The following persons and agencies were particularly useful at the state level (addresses in Chapter V).

Arizona - S. Keith, Arizona Bureau of Mines,
Colorado - A. Deborsky, Colorado Division of Mines,
R. Campbell, Colorado Division of Reclamation,
California - J. Rapp, California Department of Mines and
Geology,
Idaho - J. Skinner, U. S. Geological Survey,
Montana - C. McCall, Reclamation Division, Department of
Lands,
New Mexico - Dr. Kottlowski, New Mexico Bureau of Mines,

North Dakota - North Dakota State Outdoor Recreation Agency, Dr. E. Englerth, Division of Reclamation, State Mine Inspector's Annual Reports,
South Dakota - State Mine Inspector's Reports,
Utah - J. F. Hatch and H. Dolling, Utah Geological and Mineral Survey,
Washington - R. Kimmel, Washington Department of Natural Resources,
Wyoming - G. Glass, Wyoming Geological Survey,
R. Shaffer, Department of Environmental Quality.

The final phase of the inventory involved contacts with mine owners and operators and visits to selected mines throughout the study area. Mines for onsite visits were selected to provide a broad range of ages and ecological conditions. The emphasis of the site-visit program was placed on the older, inactive mines because information was generally unavailable from other sources. County Soil Conservation Service offices were helpful in locating specific ownerships and providing directions to older mines. The individual site visits lasted from one to several hours, and two or three mines were usually visited in a single field day. An ecologist interviewed available personnel for historical information and then toured the mine to record general observations on spoil characteristics and vegetation; observations of wildlife were noted. Upon return to the laboratory, the site-visit field notes were integrated with information from the various other sources to develop the data tables for the individual mines.

II. MINE DESCRIPTIONS

A. KEY TO TABLES

Information in each mine table is presented under six major column headings and various subheadings. This section provides a description by column heading of the format, content, and major sources for the information provided to assist the user in interpreting the tables.

The data provided in the tables are a synthesis of numerous information sources, and often represent a "best estimate" based on several conflicting sources; financial and temporal constraints precluded verification of many of the information entries. The accuracy and completeness of data entries vary greatly both between mines and between items for an individual mine due to differences in the availability and accuracy of information sources.

Mine: Listed under this column heading are the mine inventory number accompanied by the mineral commodity (coal, uranium, or phosphate), the mine name accompanied by the mine's operational status, and the name of the owner or operator. The inventory number consists of a two-letter abbreviation of the state name followed by an arabic numeral; the numerical sequence is derived from the alphabetic sequence of mines by name with coal mines listed first, uranium mines second, and phosphate mines third. The inventory number is used in summary tables, on the state maps, and in Appendix A. The mine name listed after the inventory number is that which is in most current usage; other names for the same mine may be listed below in parentheses. The operational status (operating or inactive) is listed in parentheses below the mine name. The inactive category includes orphaned sites, reclaimed sites, and sites that are currently out of production but may be re-mined in the future. The active category includes those mines that were producing in 1977. It is important to note that active mines may include both orphaned and reclaimed spoils from earlier mining activities. Large active mines are usually in areas of previous mining activity and the properties or leases often encompass areas that were mined prior to implementation of reclamation laws. The older orphaned areas are in some cases scheduled for reclamation by the current operators.

The next category lists the owner's name for inactive mines and the operator's name for operating mines to provide the user with the person or organization to contact to obtain additional information about the particular mine; addresses and contacts for these owners and operators are provided in Appendix A. The mixture of owners, operators, and lessees is very complicated, confusing, and rapidly changing due to the recent expansion of

energy-related development in the western states. Because it will be rapidly outdated, information has been sorted into only general categories, both in the tables and the appendix, to provide the user with the most current information source available.

Location: The state, county, latitudinal and longitudinal coordinates, public land survey description (township, range, and section), and name of appropriate U.S. Geological Survey topographical map are provided within the location column. The legal descriptions are generally based on owner, operator, or agency records and include only those sections that have contained mining activity through 1977. The latitude and longitude are usually based on estimates made from topographic maps. The map name listed includes the largest-scale map readily available.

Dates and Acres of Disturbance: This column summarizes the disturbance history of the mine in terms of age and acreage through 1977. The first date provided is the year that mining operations commenced and the second date is the year that all mining-related activity ceased, including any reclamation or spoil manipulation; the word "present" indicates that disturbance or production was still in progress during 1977. Additional sets of dates delineate additional time periods when the mine was active. Although some discrepancies were noted, this information is fairly accurate.

The total acreage disturbed during mining is indicated in parentheses. Where possible, the total acreage is broken down by age; and acreage estimates for pits, spoil dumps, reclaimed or treated land, and projected future disturbance are also provided. For active mines the acreage estimates are fairly reliable, but figures for older and inactive mines may be quite inaccurate. Acreage estimates were taken from various sources and also estimated from production records, field observations, topographical maps, and aerial photographs; estimates from these different sources often varied greatly, and figures included in the table are a "best estimate" based on the relative reliability of several conflicting sources. Mines were not included in the tables if their acreages were estimated at less than 10 acres. Some mines of greater than 10 acres have undoubtedly been deleted from the Atlas based on inaccurate acreage estimates.

Mining and Reclamation Plans: This column summarizes aspects of mining and reclamation methods and plans relevant to the final physical and biological conditions of the mined site, the disposition of problem strata and topsoil, and the methods and materials utilized in reclamation. This information was derived from various mine inventories, reports, and specific

mining and reclamation plans for each mine when available. When reclamation had been conducted but no plan was located, the methods that were used and dates of reclamation were summarized from interview sources and presented under this heading. Production information was not compiled.

The land-use objectives of the land owner are also specified in this column. Objectives may be those specified in the reclamation plan or those stated by the current land owner.

Pre-Mining and Current Conditions: Listed within this column are the pre-mining topography, vegetation, and land use; the current condition of spoils, reclaimed areas, and naturally revegetated areas; and, the actual land use. This information is primarily based on mine visits by NALCO ES personnel and is supplemented with data from the onsite studies of Packer and Noble (Reference 76) and other investigators. Under topography, the pre-mining terrain is described and the elevation provided. The first item under Premining Vegetation is the Kuchler (1964) potential vegetation unit (with capital letters); this represents the potential natural vegetation of the mine-site area as specified in Reference (54) and may or may not have been present prior to mining. When available, the Kuchler vegetation unit is followed by a supplementary compositional description of the dominant pre-mining vegetation inferred from field observations of vegetation surrounding the mine; botanical nomenclature follows the list of Standardized Plant Names (177) and (2). Pre-Mining Land Use is as specified by the land owner or as inferred from observations of current uses near the disturbed area.

Under Current Conditions, following the subheading of Spoils, is a range of spoil ages that may occur at the mine and a description of the physical spoil characteristics including configuration, substrate, slope, erosion, and moisture regimes. Where spoils have been reworked following initial disturbance, spoil age is based on the date of most recent disturbance or reclamation for a particular area because this is more meaningful in terms of biological restoration than are dates of initial disturbance.

Following the subheadings Natural Revegetation and/or Reclamation are descriptions of the 1977 vegetation composition, diversity, cover, and distribution based on field observations; these descriptions are broken down by spoil age wherever possible. Information is included under the heading Reclamation if the site had been treated in any manner to induce revegetation. This varies greatly from simple broadcast seeding to a full reclamation program with spoil grading, fertilization, seeding and planting, and irrigation. Although some qualitative statements are included within the tables concerning general reclamation success, it was not the intent of this study to evaluate

reclamation. Vegetation cover that has developed on untreated spoils is described under the heading Natural Revegetation.

Current Land Use provided is that observed while visiting mines or that specified by the land owner. It is usually one or more broad categories such as grazing, cropland, or wildlife. Mining is specified when most of the site is still active. Notes on wildlife and information on wildlife usage is included within the Land Use category.

Information Sources: This column contains the reference numbers of the information sources specifically used in a particular table. The number 99 represents onsite visits by NALCO ES personnel. General information sources are not specified within the tables but are included in the full source list provided in Chapter V. The list in Chapter V does not include all sources reviewed or contacted during the course of the inventory, but only those that provided information of significance. The numbers were generally assigned to the sources chronologically; an alphabetic list is provided at the end of Chapter V.

B. TABLES

The following state tables present information for the individual mines ordered by commodity. The states are combined under the following geographical regions because of general similarity of ecological conditions: Southwestern Region, Northern Great Plains Region, Intermountain Region, and Far Western Region.

TABLE 1
SOUTHWESTERN REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR COAL AND URANIUM PRIOR TO 1976 IN ARIZONA.

Table 1.

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 1 (Coal)	Arizona	'69-present (1300a)	Mining: Dragline - scraper- dozer, 3 pits. Problem spoils segregated.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6500 ft.	32, 47, 54, 76, 86, 99, 179
Black Mesa Strip Mine (Operating)	Lat 36-28N Lon 110-25W		Reclamation: Grade to original contour but highwall not reduced. Topsoiling, mulch, amendments and irrigation on experimental plots only. Drill seeding of native grasses, legumes and shrubs. Seeded areas fenced.	Vegetation: Juniper-Pinyon Woodland. Juniper-pinyon wood- land w/big sagebrush, snakeweed, and blue grama dominating the lower strata.	
Operator: Peabody Coal Co.	T35N R18E Great Springs (USGS 7.5')		<u>Land-Use Objectives:</u> Grazing.	<u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age 0-8 yrs. Extensive, gently undulating spoils with slopes ranging from 15° on south-facing slopes, to 20°. Loamy clays and sandy clay loams w/stones. Water impoundments and moisture basins present. Reclamation: Ground layer cover varies with available moisture. Spoil tops and southern and west- ern exposures dominated by crested wheatgrass, moister areas domi- nated by slender wheatgrasses and western wheatgrass. Approx 100a seeded and 650a recontoured as of 5/77. <u>Land Use:</u> Idle; vegetated sites are utilized by wildlife.	

Table 1. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 2 (Coal)	Arizona	'73-'77 (1200a)	Mining: Dragline. 2 pits. Problem strata segregated.	Pre-Mining	32, 47, 54, 76, 86, 99
Kayenta Mine (Operating)	Navajo County Lat 36-28-36N Lon 110-24-42W		Reclamation: Grade to original contour but highwall not reduced. Topsoiling, mulch, amendments and irrigation on experimental plots only. Drill seed native grasses and legumes. Plant shrubs and trees.	Topography: Hilly, elev 7100 ft. Vegetation: Juniper-pinyon woodland. Juniper-pinyon woodland w/big sage and blue grama dominating the lower strata.	
Operator: Peabody Coal Co.	T35N R18E Great Springs (USGS 7.5')		Land-Use Objectives: Sheep grazing.	Land Use: Sheep grazing. <u>Current</u> Spoils: Age 0-4 yrs. Extensive, gently undulating spoils w/slopes ranging from 15° on south-facing slopes, to 20°. Loamy clays and sandy clay loams w/stones. Water impoundments and mesic depressions present. Reclamation: 450a graded as of 5/77 (none seeded). Land Use: Idle.	

Table 1. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 3 (Uranium)	Arizona	'55-'59 (10a*)	Mining: Bulldozer operation, several shallow pits 15-30 ft deep, strip by benching. Waste material moved to previously mined areas. New deep expansion will consume most older spoils.	<u>Pre-Mining</u> Topography: Hilly, elev 1800 ft. Vegetation: Creosote Bush-Bursage and Palo Verde-Cactus Shrub.	54, 65
Anderson Mine (Inactive)	Lat 34-18-10N Lon 113-17-20W				
Owner: Minerals Exploration Company	T11N R10W-S9, 10,15,16		Reclamation: None.	<u>Land Use:</u> Unknown.	
	Arristra Mtn SE (USGS 7.5')		<u>Land-Use Objectives:</u> Unknown.	<u>Current</u> Spoils: Age 18-22 yrs. Numerous scattered pits and roads over large area. Current exploration activity.	
				<u>Natural Revegetation:</u> Unknown. <u>Land Use:</u> Unknown.	

Table 1. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 4 (Uranium)	Arizona	'53-'59	<u>Mining</u> : Shallow pit mine.	<u>Pre-Mining</u>	54, 65, 99
Charles Huskon 4	Cochise County	(7a pits, 9a spoils)	<u>Reclamation</u> : None.	<u>Topography</u> : Badlands, desert wash, elev 4000 ft.	
Paul Huskie 3 (Inactive)	Lat 35-40N Lon 111-10W		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Great Basin Sagebrush. Galleta prominent on uplands and dropped com- mon in drainages.	
Owner: Navajo Tribe	T26N R10E-S11 Mupatki NE (USGS 7.5')			<u>Land Use</u> : Grazing.	
				<u>Current</u>	
				<u>Spoils</u> : Age 18-24 yrs. Very widespread and varied; pits w/ramps, dikes, and tall mounds. Edge/area ratio high. Sandy clay both well-drained and w/moist depressions. Mill erosion common.	
				<u>Natural Revegetation</u> : Low cover (<1%). Galleta prominent on up- land spoils, tamarisk in the pit, and desert saltbush and shadscale saltbush well distributed through- out the site.	
				<u>Land Use</u> : Grazing.	

Table 1. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 5 (Uranium)	Arizona Coconino County	'53-'60 (10a)	<u>Mining</u> : Pit mine. <u>Reclamation</u> : None. <u>Land Use Objectives</u> : Unknown.	<u>Pre-Mining</u> <u>Topography</u> : Badlands, desert washes, elev 4000 ft. <u>Vegetation</u> : Great Basin Sagebrush, Rabbitbrush, Russianthistle, and, in moister areas, dropseed dominant. <u>Land Use</u> : Grazing.	54, 65, 99
Evans Huskon No. 2 and Yazzie No. 312 (Inactive)	Lat 35-52N Lon 111-25W T29N R9E-S25			<u>Current</u> <u>Spoils</u> : Age 17-24 yrs. 10-15 ft flat-topped mounds and mounds w/irregular surface features. Side slopes 25-30°. Rill eroded sandy clay well- drained and w/mudic depressions. Yazzie No. 312 pit w/standing water. <u>Natural Revegetation</u> : Almost no vegetation present on drained areas. Depressions colonized by tamarisk, dropseed, squirreltail, and Russianthistle. <u>Land Use</u> : Grazing.	
Owner: Navajo Tribe	Cameron (USGS 15')				

Table 1. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 6 (Uranium)	Arizona	'52-'71 (10a)	<u>Mining</u> : Shallow pit mine.	<u>Pre-Mining</u>	54, 65, 99,
Huskon 1 (Inactive)	Coconino County Lat 36-15N Lon 111-10W		<u>Reclamation</u> : None.	<u>Topography</u> : Badlands, elev 4400 ft.	
Gomez:			<u>Land-Use Objectives</u> : Unknown.	<u>Vegetation</u> : Great Basin Sagebrush. Desert saltbush dominants.	
Navajo Tribe	T29N R9E-S23 Cameron (USGS 15')			<u>Land Use</u> : Cattle and sheep grazing.	
				<u>Current</u>	
				<u>Spoils</u> : Age 6-25 yrs. Large continuous wind-and- water-shaped mounds w/slopes averaging 25°-30°. Well- drained clays, silt clays, and sandy clays.	
				<u>Natural Revegetation</u> : Vegeta- tion extremely scarce; very few desert saltbush.	
				<u>Land Use</u> : Cattle and sheep grazing.	

Table 1. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 7 (Uranium)	Arizona	'53-'61	Mining: Shallow pit mine.	<u>Pre-Mining</u>	54,
Huskon No. 7, 8, 10, 11, 26 (Inactive)	Coconino County	Numerous pits (3a); Largest, Huskon No. 10, is 6.5a	Reclamation: None.	Topography: Badlands, desert washes, elev 4000 ft.	65, 99
	Lat 35-47N Lon 111-20W	Total disturbance approx 10a).	<u>Land Use Objectives</u> : Unknown.	Vegetation: Grama-Galleta Stepps. Galleta, Indian rice- grass, shadscale saltbush, four- wing saltbush, desert saltbush, ephedra, and yucca prevalent.	
<u>Omer:</u> Navajo Tribe	T27N R10E-S19, 20, 26, 29, 30, 31, 33			<u>Land Use</u> : Cattle and sheep grazing.	
	Wupatki NE (USGS 7.5')			<u>Current</u>	
				<u>Spoils</u> : Age 16-24 yrs. A series of linearly arranged mounds up to 20 ft and with average slopes of 30°; few level areas on spoils. Edge/ area ratio relatively high. Spoils well-drained shaley and sandy clays. Pits and depressions more mesic.	
				<u>Natural Revegetation</u> : Ground layer cover low (1%) and restricted primarily to depres- sions; dominant herbaceous species are dropseed and Indian ricegrass. Shrubs dominating depressions are tamarisk, desert saltbush, shadscale saltbush, and ephedra. Shadscale and desert saltbush also occur on uplands.	
				<u>Land Use</u> : Cattle and sheep grazing.	

Table 1. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 8 (Uranium) Jack Hushon No. 3 (Inactive)	Arizona Coconino County Lat 35-50N Lon 111-20W	'58-'59 (16a)	Mining: Deep pit operation. Reclamation: None. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Badlands, elev 4000 ft. Vegetation: Great Basin Sagebrush. No vegetation on uplands. Rabbitbrush, four- wing saltbush, and greasewood at base of hills. <u>Land Use:</u> Grazing.	54, 65, 99
Owner: Navajo Tribe	T20N R10E-S9			<u>Current</u> Spills: Age 18-19 yrs. Large flat-topped mounds, over 20 ft high, w/outer slopes as steep as 45°. Approx 800 ft x 800 ft. Well-drained sandy clay w/gully erosion across large areas. Natural Revegetation: Vegetation infrequent, cover <1%. Tamarisk in pit and fourwing saltbush and Russiantistle in gullies. <u>Land Use:</u> Grazing.	

Table 1. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 9 (Uranium)	Arizona	'56-'60	<u>Mining</u> : 2 shallow pits.	<u>Pre-Mining</u>	54,
Juan Horse No. 4 (Inactive)	Coconino County	(3a pit, 13a total)	<u>Reclamation</u> : None.	Topography: Badlands, desert washes, elev 4000 ft.	65, 99
Owner: Navajo Tribe	Lat 35-52N Long 111-17W T29N R10E-S31		<u>Land Use Objectives</u> : Unknown.	Vegetation: Great Basin Sagebrush. Fourwing saltbush, desert saltbush, and rabbitbrush dominant.	
	Cameron (USGS 13')			<u>Land Use</u> : Grazing.	
				<u>Current</u>	
				Spoils: Age 17-19 yrs. Pit w/ramp approx 25 ft deep surrounded by low flat-topped spills (<15 ft high). Well- drained sandy clays w/moisture in pit.	
				Natural Revegetation: Revegetation primarily limited to depressions; dominants are tamarisk (in pit), dropseed, and Russian thistle.	
				<u>Land Use</u> : Grazing.	

Table 1. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 10 (Uranium)	Arizona	'57-'59	<u>Mining</u> : 2 shallow pits.	<u>Pre-Mining</u>	54,
Julia Semallie	Coconino County	(10a)	<u>Reclamation</u> : None.	<u>Topography</u> : Stony mesas and dunes, elev 4000 ft.	65,
Emmet Lee No. 3 (Inactive)	Lat 35-38N Lon 111-16W		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Great Basin Sagebrush, Rabbitbrush, desert saltbush and dropseed dominant.	99
<u>Owner</u> : Navajo Tribe	T26N R10E-S12 Mupatki NE (USGS 7.5')			<u>Land Use</u> : Grazing.	
				<u>Current</u>	
				<u>Spoils</u> : Age 18-20 yrs. Low flat-topped spoils w/outer slopes averaging 25°. Well-drained clay sands w/some gully erosion.	
				<u>Natural Revegetation</u> : Cover <1%; fourwing saltbush, desert saltbush, rabbitbrush, and galleta on drained spoils. Dropseed limited to depressions.	
				<u>Land Use</u> : Grazing.	

Table 1. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources	
AR 11 (Uranium)	Arizona	'48-'69	Mining: Originally underground, drier operation with concentrator on site, shallow pit operation, tailing piles.	<u>Pre-Mining</u>	54, 65	
Monument 2 (Inactive)	Apache County	(30-40a)		Topography: Rolling terrain, elev 4900 ft.		
Owner:	Lat 36-55N		Reclamation: None.	Vegetation: Great Basin Sagebrush and Blackbrush.		
Navajo Tribe	Long 109-55W		<u>Land-Use Objectives:</u> Unknown.	<u>Land Use:</u> Unknown.		
	T41N R23E			<u>Current</u>		
	Dennehotso			<u>Spoils:</u> 8-29 yrs.		
	(USGS 15')			<u>Natural Revegetation:</u> Unknown.		
				<u>Land Use:</u> Unknown.		

Table 1. (continued)

Mine	Location	Dates and Areas of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
AR 12 (Uranium)	Arizona	'56-'66	<u>Mining</u> : Originally underground, deep (100 ft) pit operation, much overburden.	<u>Pre-Mining</u>	54, 45
Moonlight Mine (Inactive)	Navajo County	(Approx 10a)		<u>Topography</u> : Hilly terrain, elev 6000 ft.	
Owner: Navajo Tribe	Lat 34-50N Lon 110-20W		<u>Reclamation</u> : None.	<u>Vegetation</u> : Great Basin Sagebrush.	
	T41N R19E-S10, 11, 14, 15		<u>Land-Use Objectives</u> : Unknown.	<u>Land Use</u> : Unknown.	
	Boot Mesa (USGS 15')			<u>Current</u>	
				<u>Spoils</u> : Age 11-21 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 1. (continued)

Mine	Location	Dates and Acreage of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
An 13 (Uranium)	Arizona	'56-'60	Mining: Open pit mine, 27 ft overburden, pits to 50 ft, waste piles present. Became underground operation in 1959.	Pre-Mining Topography: Badlands, desert washes, elev 4000 ft.	54, 65, 99
Rancho 20, 21, 22 (Inactive)	Cocconino County Lat 33-44N Lon 111-18W	'56-'60 (10a pits, 55a total)	Reclamation: None. Land-Use Objectives: Unknown.	Vegetation: Great Basin sagebrush. W/extensive rabbit-brush and some fourwing salt-bush and dogwood. Land Use: Unknown.	
Owner: Navajo Tribe	927W R10E-82, 11 Wapahki ME (USGS 7.5')			Current Soils: Age 17-21 yrs. Extensive and varied; pits w/ramps, washed-in pits, dikes, and tall scunds. Edge/area ratio relatively low. Clay soils; both well-drained and with moisture impoundments. All erosion common. Natural Vegetation: Vegetation poorly developed (cover <1%) tamarisk frequent in pits and behind dikes. Russiastriatic common. Land Use: Cattle and sheep grazing.	

TABLE 2
SOUTHWESTERN REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR COAL AND URANIUM PRIOR TO 1976 IN NEW MEXICO

Table 2.

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NM 1 (Coal)	New Mexico	'50-present	Mining: Prior to '76-walking drag line, mining on ridges, formerly pit mine; presently a dozer-scraper operation.	Pre-Mining	32,
Amcoal #1 (Sundance Mine) (Operating)	McKinley County	(197a)		Topography: Steeply sloping sandstone and shale hills, elev 7200 ft.	54, 64, 88, 99
Operator: Riverside Cement Co.	Lat 35-26N Lon 108-40W T14N R17W-S9 Bread Springs (USGS 7.5')		Reclamation: Grade to gentle, undulating topography with maximum 3:1 slope, highwall not reduced, lime added to reduce acidity, area fenced and fertilized, drill seeded. Scheduled for seeding in June '77.	Vegetation: Juniper-Pinyon Woodland and Grama-Galleta Steppe. Overgrazed.	
				Land Use: Grazing.	
				Current	
			Land-Use Objectives: Return to grazing.	Spoils: Age 0-27 yrs. A large rolling area w/max slope 30° (except for unreduced high- walls). Well-drained gravelly and stony loams. Spoils chained cross-slope to reduce runoff.	
				Reclamation: 126a spoil graded in '76.	
				Land Use: Mining.	

Table 2. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NM 2 (Coal)	New Mexico	Before '72	<u>Mining</u> : One pit.	<u>Pre-Mining</u>	88, 99
David Jones Mine (Inactive)	McKinley County	(10a)	<u>Reclamation</u> : None.	Topography: Steeply sloping sandstone and shale hills, elev 7200 ft.	
Owner: D. Jones	Lat 35-27N Lon 108-38W		<u>Land-Use Objectives</u> : Unknown.	Vegetation: Juniper-Pinyon Woodland. Juniper-pinyon woodland w/some oak and mountainmahogany; poorly developed blue grama ground layer.	
	T14N R17W-S9			<u>Land Use</u> : Grazing.	
	Bread Springs (USGS 7.5')			<u>Current</u>	
				Spoils: Age >5 yrs. Approximately square area bordered on two sides by highwalls; well-drained gravelly and stony limestones and sandstones w/coal.	
				<u>Natural Revegetation</u> : Very little vegetation; <1a cover by Russianthistle and rabbit- brush.	
				<u>Land Use</u> : Grazing.	

Table 2. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NM 3 (Coal)	New Mexico	'62-present	Mining: Dragline and loading shovel, 2 pits. Overburden sidecast, grading spoils begun 1 yr after mining and left fallow 1 yr for leaching of salts.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 5000 ft.	54, 65, 76
McKinley Mine (Operating)	McKinley County Lat 35-40N Lon 108-57W	'72-'76 - (367a) (Total - (1197a) Projected 7200a)	Reclamation: Dozer grade spoils of 1-5, and 1-10 yrs to original contour (max 33%), highwall not reduced, may terrace. Fertilize and mulch, drill and broadcast native and introduced grasses, legumes, and shrubs.	 Vegetation: Juniper-Pinyon Woodland. Juniper and pinyon dominated overstory w/four-wing saltbush and greasewood in the shrub stratum, and a ground layer dominated by blue grama and galleta.	
Operator: Pittsburgh and Midway Coal Company	T16N R20W-S17 Samson Lakes (USGS 7.5')		<u>Land Use Objectives:</u> Grazing.	<u>Land Use:</u> Grazing.	
			<u>Current</u> Spoils: Age 0-15 yrs. Large rolling areas of clay, clay loam, and sandy loam w/slopes of less than 33°. Soils are well-drained, some with low permeability, and with pH values ranging from 6-8.		
			Reclamation: '72-'75 480a seeded 227a final graded spoil 349a rough graded spoil 140a ungraded spoil, pits, haul roads 6a test plots During 1976: 202a seeded 205a interseeded or reseeded 59a test plots established		
			Spoils were treated as in plan. Ground cover is dominated by created wheatgrass; depressions and other waste areas are dominated by western and slender wheatgrasses. These species were not noted in adjoining unmined areas. Grease- wood is invading on spoils reclaimed in '72.		
			<u>Land Use:</u> Idle. Wildlife reported on site include: mule deer, bob- cat, jackrabbit, cottontail, and prairie dog.		

Table 2. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NH 4 (Coal)	New Mexico San Juan County	'63-'77 - (3900a) Anticipated -	Mining: Pit operation, gasifi- cation plant associated with mine, ash deposited in ungraded spoil areas and covered.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 5400 ft.	32, 54, 64, 76, 179
Navajo Mine (Operating)	Lat 36-45N Lon 108-30W	'60-'84 - (3440a) '85 on - (1140a/yr)	Reclamation: Spoils graded to gentle slopes by pushing spoil peaks into valleys; some spoils topsoiled. Some areas fertilized, mulched, irrigated, and drill or broadcast seeded w/ various seed mixtures including species such as, Alta fescue, alkali sacaton, western wheatgrass, Russian wildrye, Indian ricegrass, desert shad- scale, fourwing saltbush, and rabbitbrush.	Vegetation: Juniper-Pinyon Woodland and Saltbush- Greasewood. <u>Land Use:</u> Grazing. <u>Current</u>	
<u>Operator:</u> Utah International	T28, 29N R15W T 25, 26, 27W R16W Waterflow, Fruitland, The Hogback (USGS 7.5') Chimney Rock (USGS 15')		Land-Use Objectives: Grazing.	<u>Spoils:</u> Age 0-14 yrs. Spill material is sandstone, siltstone, or clay. Topography is near natural. <u>Reclamation:</u> 1280a seeded 1656a graded spoil 520a ungraded spoil 419a pits, haul roads, etc. Fourwing saltbush has become established (cover 10-15%). The ground layer is sparsely populated by alkali sacaton and Russian thistle. Ground- layer cover average <5%. <u>Land Use:</u> Idle.	

(continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NM 5 (Coal)	New Mexico San Juan County	'73-present (1973 - 46a 1976 - 210a total Anticipated - '79-'86 - 160a/yr)	Mining: Dragline operation. Reclamation: Spoil rows graded to gentle slopes no greater than 2:1. High walls not reduced. BLM criteria followed. Reclamation concurrent with mining; mulch, fertilize, irrigate, drill seed or broadcast seed w/sand dropped, alkali sacaton, blue grama, fourwing saltbush, and Indian ricegrass.	<u>Pre-Mining</u> Topography: Level terrain, elev 5370 ft. Vegetation: Juniper-Pinyon Woodland and Saltbush-Greasewood. <u>Land Use: Grazing.</u> <u>Current</u> Spoils: Age 0-4 yrs. Flat to undulating terrain. Substrate is sandstone and siltstone or sandy topsoil. <u>Reclamation:</u> 32a seeded 7a test plots 50a graded spoil 98a ungraded spoil 40a otherwise disturbed Ground layer cover low, generally <5%. Russianthistle and sand droppseed are dominants. Four- wing saltbush has become estab- lished providing 10-15% cover. Areas not irrigated have not revegetated well.	32, 54, 64, 76
Operator: Western Coal Co. (Utah International)	T10W R15W Waterflow, Heifer Point, Youngs Lake, Purgatory Canyon (USGS 7.5')		<u>Land-Use Objectives:</u> Grazing.	<u>Land Use: Idle; wildlife sighted include antelope and cattle.</u>	

Table 2. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NM 6 (Coal)	New Mexico	'72-present	Mining: Dozer - loader operation.	<u>Pre-Mining</u>	32,
West York Strip	Colfax County	'73 - 2a	Overburden varies 0-200 ft, immediately	Topography: Hilly terrain,	46,
(York Canyon	Lat 36-52-14N	'74 - 51a	replaced in pit, 30-40a/yr projected.	elev 7800 ft.	47,
Mine)	Lon 104-56-08W	'75 - 41a			54
(Operating)		52a			
Operator:	T31N R19E	Total '76 - 167a	Reclamation: Regrade to natural	Vegetation: Juniper-Pinyon	
Kaiser		Projected - 1080a)	contour but highwall not reduced.	Woodland.	
Steel Co.	Casa Grande		Topsoil and plant to native grasses		
	(USGS 15')		and forage crops, fertilize and	<u>Land Use:</u> Grazing.	
				<u>Current</u>	
			<u>Land-Use Objectives:</u> Grazing and	<u>Spoils:</u> Age 0-5 yrs.	
			wildlife.	<u>Reclamation:</u> '74 - 14a treated	
				'76 - revegetation	
				proceeding	
				slowly due to lack of rain '74-'76.	
				<u>Land Use:</u> Idle.	

Table 2. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MM 7 (Uranium)	New Mexico Valencia County	'52-'70 (15a)	Mining: Shallow pit operation, numerous pits and stripped areas. Largest pit 7a.	<u>Pre-Mining</u> <u>Topography:</u> Mesa, elev 7000 ft. <u>Vegetation:</u> Grass-Galleta Steppe and Juniper-Pinyon Woodland. Dense ground layer cover of blue grama. <u>Land Use:</u> Grazing.	54, 65, 99, 109
Farris (Section 9) Mine (Inactive)	Lat 35-20W Lon 107-50W		<u>Reclamation:</u> None. <u>Land-Use Objectives:</u> Unknown.		
Owner: E. Rundy	T12N R9W-S9 Grants (UBGS 7.5')			<u>Current</u> <u>Spoils:</u> Age 7-25 yrs. Approx 15a; ridges and scattered piles with slopes up to 40°. Well-drained rock, sand and sandy clays. <u>Natural Revegetation:</u> Ground layer cover up to 50% on heavier soils, primarily blue grama- threeseed w/scattered snakeweed on heavier soils, and primarily Indian ricegrass on lighter soils. Rabbitbrush and fourwing salt- bush provided 5% cover on uplands. Pinyon and juniper are invading. <u>Land Use:</u> Unknown.	

Table 2. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
UM 8 (Uranium)	New Mexico	'52-'72 (36a)	Mining: Doser, pit operation. Approx- imately 10 pits, largest 12a, wastepiles present. Topsoil stockpiled.	Pre-Mining	54,
Haystack Mine	McKinley County	'75-'77 (15a+)		Topography: Mesa, elev 7500 ft.	65,
(Operating)	Lat 35-25N	(51a total)		Vegetation: Grama-Galleta Steppe and Juniper-Pinyon Woodland.	89,
Operator:	Lon 100-55W		Reclamation: Backfill pit, grade to original contour, topsoil, and seed w/native grasses.	Land Use: Grazing.	99
Todilto	T13N R10W-S9		Land-Use Objectives: Grazing.	Current	
Exploration	Bluewater			Spoils: Age 0-25 yrs. Small mounds of max height 15 ft, max slope 30°, well- drained loamy sands and gravels w/stones.	
Development	(USGS 7.5')			Natural Revegetation: 36a uniform grass cover of 40%, primarily blue grama-threawn w/scattered Indian ricegrass and snake-weed. Shrubs are invading w/cover of <5% and included juniper, fourwing saltbush, prickly pear, and rabbitbrush. As produc- tive as unmined area.	
				Reclamation: No reclamation to present. Planned reclamation will be limited to current pit opera- tions.	
				Land Use: Mining and grazing.	

Table 2. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MM 9 (Uranium)	New Mexico	'52-'76 (2700a)	Mining: Show'l, truck operation, deep pit (200 ft). Originally overburden stripped, piled nearby. Now waste back- filled. Low grade ores stockpiled and leached in situ.	<u>Pre-Mining</u> <u>Topography:</u> Hilly, elev 6000 ft. <u>Vegetation:</u> Grama-Galleta Steppe, Juniper-Pinyon Woodland. Ground layer dominated by blue grama, Indian ricegrass (primarily on slopes), and snakeweed. <u>Land Use:</u> Grazing.	54, 65, 90, 99
Jackpile- Paquete Mine (Operating)	Valencia County Lat 35-08N Lon 107-25W		<u>Reclamation:</u> Dozer grade to terraced or original contour, may top with crushed Tres Hermanos sandstone, mulch, and seed with a nurse crop, legumes, and native grasses. Four- wing saltbush will be seeded on slopes. 375 additional acres will be reclaimed in '77.	<u>Current</u> <u>Spoils:</u> Age 1-25 yrs. Primarily large mesa-like flat- topped dumps as high as 50+ ft and w/outer slopes as steep as 35°-40°. Surface material varies from crushed Tres Hermanos sand- stone to shale and loamy sands and gravels. Well drained. <u>Reclamation:</u> In '76, 80a were re- contoured, topped with crushed Tres Hermanos sandstone, mulched, and seeded. After one year, the domi- nant species is annual barley (a nurse crop), associated w/yellow clover, wheatgrasses and blue grama. <u>Natural Revegetation:</u> Fourwing salt- bush, rabbitbrush, snakeweed, and Indian ricegrass are common in erosion washes on spoils w/sandy substrate; revegetation on substrates of shale derivative is negligible. <u>Land Use:</u> Mining and grazing.	
Operator: The Anaconda Co.	T10N R5W-S5, 8, 9, 16 T11N R5W-S32, 33, 34 Laguna (USGS 7.5')		<u>Land-Use Objectives:</u> Grazing.		

Table 2. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MM 10 (Uranium)	New Mexico	'51-'76 (15a)	Mining: Surface pit prior to '57 underground since that time. 2 pits. Reclamation: None. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Hilly, elev 7000 ft. Vegetation: Grama-Galleta Steppe, Juniper-Pinyon Woodland. Juniper and pinyon overstory w/fourwing saltbush, cholla, and rabbit- brush common in the lower strata. <u>Land Use: Grazing.</u>	54, 65, 99
Poison Canyon Mine (Operating)	Lat 35-25N Lon 107-50W				
Operator: Reserve Oil and Minerals	T13M #9W-S19 Dos Lomas (USGS 7.5')			<u>Current</u> Spoils: Age 1-26 yrs. Large linear mound approxi- mately 30 ft high with average slope 35°. Well-drained sand w/stones. Natural Revegetation: Ground cover <1%, primarily of Indian ricegrass w/threesawn and very little blue grama. Fourwing saltbush and rabbitbrush infre- quent and restricted to base of spoils. <u>Land Use: Grazing.</u>	

Table 2. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MM 11	New Mexico McKinley County	'52-'70 (17a+)	Mining: Surface pit to '50, 10 pits, largest 1a. Underground since '50. Reclamation: None. Land-Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: hilly terrain, elev 7000 ft. Vegetation: Grass-Galleta Steppes, Juniper-Pinyon Woodland. <u>Land Use:</u> Unknown. <u>Current</u> <u>Spoils:</u> Age 7-25 yrs. <u>Natural Revegetation:</u> Unknown. <u>Land Use:</u> Unknown.	54, 65
Section 25 Mine (Inactive)	Lat 32-25N Lon 107-55W				
Dewar Citrus County Land Bureau	T13N R10W-S25 Blueswater (USGS 7.5')				

TABLE 3
NORTHERN GREAT PLAINS REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR COAL AND URANIUM PRIOR TO 1976 IN COLORADO

Table 3.

Mine	Location	Dates and Areas of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources	
CO 1 (Coal)	Colorado	'63-'68 (115a)	Mining: Several deep pits w/spalls dumped surrounding pit. Deeper operation.	Pre-Mining	31.	
Anas Strip #1, #2 (Inactive)	Fremont County			Topography: Rocky slopes, elev 9800 ft. sandstone outcrops.	34, 99, 118	
Owner: L. Galliano	Lat 38-21N Lon 105-11W T20S R70W-51 Rockvale (USGS 7.5')		Reclamation: None. Land Use Objectives: Grazing.	Vegetation: Juniper-Pinyon Woodland. Pinyon Juniper w/rabbitbrush, blue grama, cacti. Land Use: Grazing.		
				Current		
				Eggs: Age 9-14 yrs. Very steep cuts and mounds w/rockpiles and clay heaps. Average slopes of 20°, maximum 90° near pits. Surface material of clay and rock w/coal and sandy areas. No water in pits but gully and rill erosion common. Natural Revegetation: Highly varied cover. Shrubs include 0-5% cover of rabbitbrush, some well developed in gullies and depressions. Ground layer also varied w/Indian ricegrass, cheat- grass, needlegrass, weedy forbs, foxtail barley, Russiastriate, leucums and mint; cover 20% ranging from 0-50%. Decrease in depressions and gullies.		
				Land Use: Grazing.		

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 2 (Coal)	Colorado	'71-'73	Mining: Several deep pits w/spoils dumped surrounding pit. Dozer operation.	Pre-Mining	31, 54, 99, 118
Annex Strip #2, SW (Inactive)	Fremont County Lat 38-21N Lon 105-11W	(25a; 8a pit, 17a reclaimed dumps)	Reclamation: Spoils graded, no top- soil, amendments, mulch, or irrigation. Crested wheatgrass and clover broadcast seeded.	Topography: Rocky upland slope, elev 5800 ft. Sandstone outcrops. Vegetation: Juniper-Pinyon Woodland. Pinyon, juniper w/rabbitbrush, blue grama, cacti.	
Owner: L. Gullano	T20S R70W-S1		Land Use Objectives: Grazing.	Land Use: Grazing.	
	Rockvale (USGS 7.5')			<u>Current</u>	
				Spoils: Age 4-6 yrs. Several pits w/graded spoil piles surrounding, average slope 10°, max 80° along pit walls. Substrate composed of gravelly silt loam w/rocks and occasional sandy areas. No water in pits, erosion chiefly on pit walls. Reclamation: Vegetation cover fairly uniform, 15-20% of crested wheatgrass, summercypress, Russianthistle, mullein, and yellow sweetclover. No vegetation on steep pit walls. Natural Revegetation: Some encroachment of rabbitbrush at margins, several pinyon trees.	
				Land Use: Grazing.	

Table 3. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 3 (Coal)	Colorado	'47-'64 (25a)	<u>Mining</u> : Contour mine, highwall and spoil heaps not reduced.	<u>Pre-Mining</u>	31, 54, 99,
Beer Strip South (Inactive)	Fremont County Lat 38-18N Lon 105-09W		<u>Reclamation</u> : None.	Topography: Hilley terrain, elev 5900 ft. 99, Foot hills, ridges and valleys w/sandstone lie outcroppings.	
Owner: GEC Minerals	T206 N69W-S18 Rockvale (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	Vegetation: Juniper-Pinyon Woodland. Pinyon, juniper w/variable cover and high edge/area ratio.	
				<u>Land Use</u> : Grazing.	
				<u>Current</u>	
				Spoils: Age 13-30 yrs. Contour mining formation w/highwalls and spoil piles. Avg. slope 40°, varying from 10-70°. Substrate composed of sands, sandy-clay and coal. Standing water present, gully and rill erosion on clay and spoil banks.	
				<u>Natural Revegetation</u> : Most of spoils w/varied ground layer of grasses, Russian thistle, pigweed and blazing star. Cover averaging 20%, varies 0-50%. Moisture depressions have greatest cover.	
				<u>Land Use</u> : Grazing. Local avifauna noted.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 4 (Coal)	Colorado	'64-'69 (35a)	Mining: Contour/area mine, highwall and spoils not reduced.	<u>Pre-Mining</u>	31, 54,
Beer Strip No. 2 (Inactive)	Fremont County	GEC to do additional mining in future.	Reclamation: Unknown.	Topography: Hilly terrain, elev 6100 ft. Foothills, ridges and valleys, sandstone outcropping.	67, 99, 116
Owner: GEC Minerals	Lat 38-17N Lon 105-08W		Land Use Objectives: Unknown.	Vegetation: Juniper-Pinyon Woodland. Pinyon, juniper and oak woodland with rabbitbrush, cactus.	
	T20S R69W S-19,30			<u>Land Use: Grazing.</u>	
	Rockvale (USGS 7.5')			<u>Current</u>	
				Spoils: Age 8-13 yrs. Highwall and spoils dozed into valleys. Avg. slope 40°, max 80°. Spoil ridges to 60 ft in height. Spoils varied and composed of shale and gravel with clay soil. Streams and ponds present, rill erosion and little vegetation cover.	
				Reclamation: Some oak, pinyon and juniper trees (1-2 ft) apparently planted.	
				Natural Revegetation: Varied cover of shrub and herb species. Dominant shrubs include skunkbush, rose, oaks, and <u>Prunus</u> <u>spp.</u> Avg. cover 2%, varies 0-20%. Russethatched, native wheatgrasses, Indian ricegrass, groundcherry, sunflower and legumes in ground layer; avg cover 10%, varies 0-50%. Moist areas well vegetated, as are areas with favorable soils.	
				<u>Land Use: Grazing.</u> Local avifauna common.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 5 (Coal)	Colorado	'47-'48 (10a)	Mining: Shallow dozer pits w/spoil piles surrounding.	<u>Pre-Mining</u>	31, 54,
Black Dan Strip (Inactive)	Routt County		Reclamation: w/Osage Strip (CO 21) '63 - ridge tops dozed	Topography: Alluvial floodplain/ foothills interface, elev 6600 ft.	97, 98, 99
Owner: M. Hitchens	Lat 40-28-30W Lon 107-02-00W		'65 - aerial seeded w/intermediate wheatgrass, pubescent wheatgrass, smooth brome, timothy, hard fescue, alfalfa, and yellow sweetclover. '67 - possibly additional aerial seeding and tree planting.	Vegetation: Sagebrush Steppe. w/ big sagebrush and rabbitbrush.	
	T6N R66W-S16			<u>Land Use: Grazing.</u>	
	Milner Quad (USGS 7.5')		<u>Land Use Objectives: Unknown.</u>	<u>Current</u>	
				Spoils: Age 29-30 yrs. Shallow pits and spoil piles, slopes 0-60°. Clay and clay loam w/areas of gravel and coal. Active rill erosion on steep clay banks.	
				Reclamation: Some 50-ft cottonwoods; big sagebrush on areas w/cover under 10% overall. Ground cover of alfalfa, yellow sweetclover, and numerous forbs and grasses as at Osage Strip, 0-80% cover (Avg. 40%).	
				<u>Land Use: Grazing, adjoins wheat field, equipment storage.</u>	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 6 (Coal)	Colorado	'63 - Present (20a)	<u>Mining</u> : Dozer-scraper operation.	<u>Pre-Mining</u>	31, 54,
Coal Canyon Strip (Operating)	Mesa County		<u>Reclamation</u> : Unknown.	<u>Topography</u> : Hilly terrain near base of mountains, elev 6000 ft.	99
<u>Operator</u>	Lat 39-06N Lon 108-22W		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Saltbush-Greasewood.	
Coal Canyon, Inc.	T11S R96W-S5			<u>Land Use</u> : Wildlife.	
	Cameo (USGS 7.5')			<u>Current</u>	
				<u>Spoils</u> : Age 0-14 yrs. Large, flat areas of spoil dumps w/side slopes of 0-45°. Material compacted and composed of soil and rocks. Minor erosion evident on unconsolidated spoil edges.	
				<u>Natural Revegetation</u> : Highly varied and sparse ground cover, less than 16. Most areas barren.	
				<u>Land Use</u> : Mining. Most of area currently under disturbance from mining operations.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 7 (Coal)	Colorado	'73-'75 (540a)	Mining: Scraper-doser operation. Scattered area and contour mining. May be reclaimed.	<u>Pre-Mining</u>	30,
Corley S & A, NW (Inactive)	Fremont County	May remain.		Topography: Ridge and valley, elev 5600 ft.	31, 32,
Owner: GEC Minerals	Lat 38-17-20N Lon 105-10-15W		Reclamation: Some spoils contoured near road. GEC may reclaim.	Vegetation: Juniper-Pinyon Woodland.	44, 47,
	T20S R6W-S6,7, 18,19,30,31		Land Use Objectives: Unknown.	Land Use: Grazing.	54, 99,
	T20S R7W-S1,12, 13,24			<u>Current</u>	116
	Rockvale (USGS 7.5')			Spoils: Age 2-4 yrs. Contoured spoil configuration, slopes to 30°. Surface primarily sandstone, rocks, clay and sand. Several acres w/topsoil. Gully and rill erosion.	
				Reclamation: None completed to date.	
				Natural Revegetation: Area essentially barren, no trees or shrubs. Varied cover of grass, most on few areas w/topsoil. Cover 10%, ranging 0-40%.	
				Land Use: Idle. GEC may rework spoils and mine some areas.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 8 (Coal)	Colorado	'73-'75 (350a)	Mining: Scraper-dozer operation. Scattered area and contour mining.	<u>Pre-Mining</u>	30,
Corley S & A, SE (Inactive)	Fremont County	May remain.		Topography: Ridge and valley, elev 5600 ft.	31, 32, 44, 47,
Owner: GEC Minerals	Lat 38-17-20N Lon 105-10-15W T20S R69W-S6, 7, 18, 19, 30, 31 T20S R70W-S1, 12, 13, 24		Reclamation: None. <u>Land Use Objectives:</u> Unknown.	Vegetation: Juniper-Pinyon Woodland. <u>Land Use:</u> Grazing. <u>Current</u>	54, 99, 116
Spoils: Age 2-4 yrs. Large spoil dumps, area and contour pits. Spoils very irregular and steep, 60 ft high w/slopes 45-90°. Surface composed of sands, clays w/coal, shale and large rocks exposed. Some water in valleys, gully and sheet erosion present. Natural Revegetation: Essentially none. Varied ground cover, less than 5% of Russianthistle, summercypress, and cheatgrass. <u>Land Use:</u> Grazing. GEC may reclaim and remin area.					

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 9 (Coal)	Colorado	'45-'69 (670a)	Mining: Dragline-shovel operation. One current operation.	Pre-Mining	25,
Edna Mine (Operating)	Routt County	Of this: '65-'68 (300a treated)	Reclamation: '65-'68 - Ridge tops dozed and aerial seeded w/wheatgrasses, other grasses, alfalfa, and sweetclover. A few shrubs and trees were also planted. Most of these pre-law treatments will be re-mined or retreated to comply w/ current plan.	Topography: Foothills, elev 7000-8000 ft.	28, 31, 32, 47,
Operator: Pittsburg and Midway	Lat 40-19-55N Lon 107-00-40W T4N R85W-S7, 18,19 T4N R86W-S12, 13,14,24 Rattlesnake Butte (USGS 7.5') Oak Creek (USGS 7.5')	'75-'77 (75a treated) after '77, 350a will be re-mined, the remainder will be additionally reclaimed. '69-'77 (890a) Of this: 790a have been treated. '77-'90 project 1100a	Reclamation: '69 on - Stockpile topsoil, reduce highwall, grade to hilly terrain. Topsoil and drill grasses (crested, intermediate, slender, Siberian and western wheatgrasses, smooth and mountain brome, hard and Arizona fescue), legumes (milkvetch and yellow sweetclover), and shrubs and trees (snowberry, winterfat, serviceberry, fourwing saltbush, antelope bitterbrush, rose, Gambel oak, aspen, and chokecherry).	Vegetation: Mountain Mahogany-Oak Scrub. w/big sage brush, Gambel oak, serviceberry, and snowberry. Steep north slopes w/aspen and snowberry. Land Use: Grazing. Current	54, 76, 98, 99, 103
			Land Use Objectives: Grazing and wildlife.	Spills: Age 0-12 yrs. Pre '69 - parallel sloping ridges w/ tops flat. Mixed clay, shale, gravel, rubble. Post '69 - gently undulating surface approximating original. Clay, clay-loam, gravel, shale, and rubble; erosion minimal. Reclamation: Pre '69 - occasional aspen in troughs, big sagebrush up to 50% cover in some areas, 60% ground layer cover of sweetclover and a variety of grasses as seeded. Varies greatly depending on conditions. Post '69 - varies greatly in development and success. No trees and shrubs in '77. Grass mixtures as planted providing up to 20% cover. Land Use: County land fill, idle, wildlife.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 10 (Coal) Energy Mine #1 (Operating)	Colorado Butte County Lat 40-20-30N Lon 107-03-00W	'62-present (727a) Of This: '63-'69 (294a treated) '69-'73 (250a treated or retreated) '77 110a (active) '82 (projected closure)	<u>Mining:</u> Dragline-truck-shovel operation. 3 draglines active in '77. <u>Reclamation:</u> '65-'68 - 294a partially graded and aerial seeded w/wheat/grasses, other grasses, alfalfa, and sweetclover. Trees and shrubs planted also. Stockpile topsoil, reduce highwall, rester original contour. Topsoil and in fall drill 20 species of native grasses, legumes and shrubs; and plant trees w/front end loader. All older reclamation will be retreated to comply w/current plan. Land Use Objectives: Grazing and wildlife. Will leave migration corridors for deer/elk and will manage 150a for elk winter range.	<u>Pre-Mining</u> Topography: Potholes, elev 7000-7600 ft. Vegetation: Mountain Mahogany-Oak scrub, Sagebrush Steppe. w/big sage- brush, Gambel oak, serviceberry, chokecherry. Some aspen w/snow- berry. Land Use: Grazing, wildlife (elk winter range), wheat farming. <u>Current</u> Soils: Age 0-15 yrs. Gently rolling surface. Clay, clay- loam, rubble. Erosion minimal. Reclamation: Ground cover 10-20% of seeded grasses. Success highly varied depending on age and site. Most cover very recent. Land Use: Idle, wildlife. 30 elk winter on mine.	28, 30, 31, 32, 54, 76, 98, 99, 104

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 11 (Coal) Energy Mine #2 (Operating)	Colorado Boutt County Lat 40-22-00N Lon 107-05-00W	'72-present (955a) '74 (11a treated) '76 (470a treated) '78 (close)	Mining: Dragline (2) - scraper. One continuous pit. Reclamation: '73-11a, topsoiled and seeded w/over 20 species of grasses and legumes. Oldest post-law reclamation area in state. '76-470a, same. Stockpile topsoil, reduce highwall, restore original contour. Topsoil and fall drill 20 species of native grasses, legumes, and shrubs.	<u>Pre-Mining</u> Topography: Foothills, alluvial valley, elev 6800-7200 ft. Vegetation: Sagebrush Steppe. Wheat Fields. <u>Land Use</u> : Wheat farming.	28, 30, 31, 32, 34, 76, 99, 104
Operator: Energy Fuels Corp.	TSM R86W-S19, 30 TSM R87W-S24, 25 Battlesnake Butte Milner Quad (USGS 7.5')		<u>Land Use Objectives</u> : Return to wheat production when bond released.	<u>Post-Mining</u> Spoils: Age 0-5 yrs. Returned to original contour, topsoil of clay, shale and sandstone. Reclamation: Ground layer dominated by western wheatgrass w/weedy annuals. <u>Land Use</u> : Idle.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 12 (Coal) Energy Mine #3 (Operating) Operator: Energy Fuels Corp.	Colorado Routt County Lat 40-25-00N Lon 107-06-00W T5N R66W-S1,2, 12 Milner (USGS 7.5')	'75-present (222a) '76 #5a reclaimed	Mining: Truck-shovel-scraper operation. May continue as underground. Reclamation: '76-#5a treated by plan. Stockpile topsoil, reduce highwall, restore original contour. Topsoil and in fall drill 20 species of native grasses, legumes, and shrubs. Land Use Objectives: Grazing.	<u>Pre-Mining</u> Topography: Foothills, elev 7000-7600 ft. Vegetation: Sagebrush Steppe. w/big sagebrush, western wheatgrass, other grasses. <u>Land Use: Grazing.</u> <u>Current</u> Spoils: Age 0-2 yrs. Near natural terrain w/contour trenches. Topsoil of clay and shale. Some erosion. <u>Reclamation:</u> Varied stand of alfalfa and grasses but too early to evaluate success. <u>Land Use: Idle.</u>	28, 30, 31, 32, 54, 76, 99, 104

Table 3. (continued)

Mine	Location	Dates and Areas(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 13 (Coal)	Colorado	'48-'53 (12a)	Mining: Doser-shovel operation, one long pit with spoils cast to side.	<u>Pre-Mining</u>	10,
Erie Strip (Inactive)	Weld County			Topography: Rolling terrain, elev 5000 ft.	31,
Owner: Union Pacific	Lat 40-7N Lon 105-00W		Reclamation: None.	Vegetation: Grama-Buffalo Grass.	32,
Railroad	T2N R6W-S33		<u>Land Use Objectives:</u> Unknown.	Adjoining areas in wheat.	54,
	Erie			<u>Land Use:</u> Agriculture.	99
	(USGS 7.5')			<u>Current</u>	
				Spoils: Age 24-29 yrs. Long pit, water filled w/20-60' slopes and depth of 50 ft, adjacent spoils steep and composed of clay-loam w/gravel. Mill erosion on steep slopes.	
				Natural Revegetation: Varied ground layer cover of cheatgrass, western wheatgrass, legumes, sumpscypress, Russiantistle and other forbs. Cattail and saltgrasses near water. Cover varied 0-80% depending on slope and moisture.	
				<u>Land Use:</u> Recreation, oil well, idle. Some areas being used to demonstrate reclamation machinery.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 14 (Coal)	Colorado	'48-'65 (30a)	Mining: Area dragline-doser operation. 2 main pits w/several smaller ones.	<u>Pre-Mining</u>	31, 54, 99, 117
Franceville Strip (Inactive)	El Paso County Lat 38-48N Lon 104-36W		<u>Reclamation:</u> None.	Topography: Rolling high plain, elev 6100 Ft. Adjoins alluvial wash.	
Omnig: Union Pacific Railroad	T148 M44W-419 Corral Bluffs (USGS 7.5')		<u>Land Use Objectives:</u> Unknown.	Vegetation: Grama-Buffer Grass. Grassland dominated by Buffalo-grass, blue grama and western wheatgrass. <u>Land Use:</u> Grazing.	
				<u>Current</u>	
				<u>Spoils:</u> Age 12-29 yrs. Rolling mounds and heaps w/pits. Average slope 10°, max 60°. Surface composed of sandy-loam and clay-loam w/shale and coal. Ponds present and moist depres- sions. Gully and rill erosion common. <u>Natural Vegetation:</u> Vegetation cover varied, some large cottonwoods in wet depressions, oakwood present. Ground layer highly varied, steep slopes bare, vegetation in level and wet areas. Buffalograss/blue grama dominant w/sumac, sweetclover, and legumes. Heavily over-grazed. <u>Land Use:</u> Grazing. Shore birds noted.	

Table 3. (continued)

Mine	Location	Dates and Acreage of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 15 (Coal)	Colorado	'58-Present (125a)	Mining: Scraper-doser operation	Pre-Mining	30,
GEC Mines	Fremont County	'58-'65 (30a)	Area mining, reclaimed as mining proceeds. Plan in preparation.	Topography: hilly terrain, elev 6,300 ft.	31,
(Corley, Black Diamond Strip) (Operating)	Lat 38-17-20N Lon 105-10-15W	'69 (80a)	Reclamation: Topsoil stockpiled, highwall reduced. Spoils contoured to rolling terrain, max 3:1 slope. Topsoiled, drill seeded with native grasses of sand dunes, Indian ricegrass, and yellow sweetclover. No amendments, mulch or irrigation. Old spoils also being reclaimed.	Vegetation: Juniper-Pinyon Woodland. Gambel oak, mountain mahogany, shrub-bush and Utah juniper w/blue grama, hairy grama. Interspersed grassland areas w/blue grama, ring molly, blue-grass, rabbitbrush, and sand dropseed.	32,
Operator: GEC Minerals	T206 R70N-624	'73-'77 (15a)		Land Use: Grazing.	38,
	Rockvale (USGS 7.5')		Land Use Objectives: Grazing.	Current	54,
				Spoils: Age 0-19 yrs. Contoured spoils near natural terrain, some old spoils still orphaned. Surface material clay-shale w/sandy and gravelly areas throughout. Some rill erosion.	76,
				Reclamation: Currently in operation. Recently treated areas have 20% cover of sweetclover and cheatgrass brome.	99,
				Land Use: Mining, idle.	116

Table 3. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 16 (Coal)	Colorado	'47-'49 (10a)	Mining: Unknown.	<u>Pre-Mining</u>	11, 54
Loma Park Strip (inactive)	Huerfano County		<u>Reclamation</u> : Unknown.	<u>Topography</u> : Probably foothills.	
Operator:	Lat 37-40N		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Grama-Buffalo Grass.	
Park Coal Co.	Lon 104-60W			<u>Land Use</u> : Unknown.	
	T27S R66W-S31			<u>Current</u>	
	Walsenburg North			<u>Spoils</u> : Age 28-30 yrs.	
	(USGS 7.5')			<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 3.
(continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 17 (Coal)	Colorado	'74-'77 (90a)	<u>Mining:</u> Scraper-doser operation.	<u>Pre-Mining</u>	28, 30, 31, 32, 47, 54, 100
Marr Strip #1 (Operating)	Jackson County		Reclamation: Stockpile topsoil, reduce highwall, recontour to rolling terrain, topsoil and drill native grasses. Runoff control structures.	Topography: Rolling upland, elev 8200 ft.	
Operator:	Lat 40-43-00N			Vegetation: Sagebrush Steppe.	
Kerr Coal Co.	Lon 106-07-00W			<u>Land Use:</u> Cattle grazing.	
	T9N R76W-S25, 26,35		<u>Land Use Objectives:</u> Cattle grazing.	<u>Current</u>	
	Johnny Moore Mt. (USGS 7.5')			Spoils: Age 0-3 yrs. Being contoured in '77.	
				Reclamation: None completed in '77.	
				<u>Land Use:</u> Idle.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 18 (Coal)	Colorado	'09-'18 under-	Mining: Underground and surface.	Pre-Mining	54,
Moore Mine	Jackson County	ground, disturbed	Reclamation: Pit walls have been	Topography: Sloping high parkland,	99,
(Inactive)	Lat 40-33-30N	on-and-off since	recently terraced and apparently	elev 8250 ft.	101
Owner:	Lon 102-26-30W	extinguish coal	seeded.	Vegetation: Sagebrush Steppe, w/ big	
Mrs. W. Moore	T7N R81W-S24	fire that burned	Land Use Objectives: Unknown.	sagebrush, other sages, rabbitbrush.	
(Some confusion	Coalmont	'31-'50 probably		Land Use: Grazing.	
on mine names)	(USGS 7.5')	some surface		Current	
		mining.		Spoils: Age unknown.	
		Recent disturbance		Deep pit w/ terraced walls.	
		evident (10a).		Heterogeneous mixture of sandstone,	
				clay and coal.	
				Reclamation: Pit floor contains shrub	
				stratum of sage and rabbitbrush w/40%	
				cover. Terraces contain immature	
				grasses and forbs (20% cover) which are	
				concentrated in trenches and have apparently	
				been recently seeded.	
				Land Use: Shooting range. Local avifauna	
				common.	

Table 3. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 19 (Coal)	Colorado	'31-'50 (15a)	Mining: Dozer-shovel operation. One pit and spoils dumped surrounding pit.	Pre-Mining Topography: Level high parkland, elev 8200 ft.	31, 54, 99, 101
Moore Strip (Inactive)	Jackson County Lat 40-33-00N Lon 102-27-30W		Reclamation: None.	Vegetation: Sagebrush Steppe. w/big sagebrush, rabbitbrush, other sages, and numerous grasses.	
Owner: G. Walker	T7N R81W-S26		Land Use Objectives: Grazing, recreation.	Land Use: Grazing.	
(Some confusion on mine names)	Coalmont (USGS 7.5')			<u>Current</u> Spoils: Age 27-46 yrs. Water-filled, 15-ft deep pit (3a lake) surrounded by spoil piles of 5 to 20 ft. Slopes 80° in pit and average 15° in spoil piles. Heterogeneous mixture of clay, shale, and coal w/evident gully erosion. Natural Revegetation: Highly varied depending on substrate. Native sages and rabbitbrush invading perimeter (0 to 30% cover). Ground layer of weedy forbs from 0 to 20% cover (average 10%). Evidence of overgrazing. Land Use: Grazing, fishing, waterfowl.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 20(Coal)	Colorado Montrose County	'59 - Present (230a)	Mining: Open cast mining using dragline, series of consecutive parallel pits. Highwall reduced, problem spoils segregated.	Pre-Mining Topography: Rolling terrain, elev 5600 ft.	30, 31, 38, 47, 54
Operator: Peabody Coal Co.	Lat 38-07N Lon 108-32W T47N R15W T47N R16W Nuc1a (USGS 7.5')		Reclamation: Topsoil stockpiled, spoils recontoured to rolling terrain, max slope 4%. Spoils topsoiled, no amendments, mulch or irrigation. Native grasses and legumes broadcast seeded. Reclamation begins after 3 pits mined, grading kept 2 spoils behind stripping. <u>Land Use Objectives: Grazing.</u>	Vegetation: Great Basin Sagebrush. <u>Land Use: Cropland, grazing.</u> Current <u>Spoils: Age 0-10 yrs.</u> <u>Reclamation: Unknown.</u> <u>Land Use: Unknown.</u>	

Table 3. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 21 (Coal)	Colorado	'49-'61 (500a)	Mining: Contour and area mining. 3 areas of approximately equal size.	Pre-Mining Topography: Foothills into alluvial valley, elev 6600-7000 ft.	31, 54, 97, 98, 99
Osga Strip (Inactive)	Routt County Lat 40-27-30N Lon 107-02-30W		Reclamation: '63 - ridge tops dozed in northern areas. '65 - 200a aerial seeded w/ intermediate wheatgrass, pubescent wheatgrass, smooth brome, timothy, hard fescue, alfalfa, yellow sweetclover. '67 - 276a aerial seeded w/ crested wheatgrass, western wheatgrass, tall fescue, orchardgrass, brome, alfalfa, yellow sweetclover, white sweetclover. Tree seedlings of unknown mixture and number planted.	Vegetation: Sagebrush steppe. w/ big sagebrush and rabbitbrush. Aspen on north-facing steep slopes. Wheat farming on level uplands.	
Owner: M. Hitchens	T6N R66W-S16, 21,28 Milner (USGS 7.5')			Land Use: Grazing, possibly some wheat farming.	
				Current Spoils: Age 16-20 Yrs. North area - trenches, pits and spoil heaps w/ many high walls from contour mining. Slopes 0-50° w/ average of 30°, ridge tops leveled. Clay, clay loam w/ gravel; several small ponds, erosion on steepest slopes. South area - parallel spoil ridges, tops and high walls not reduced, slopes average 40°. Exposed coal, large rocks, gravels, and sandy loams. Several ponds.	
			Land Use Objectives: Unknown.	Reclamation: North area - occasional aspen invading north slopes and some survival of Russian olive. 30-ft cottonwoods in moist pits. The shrub layer w/ up to 50% cover of big sagebrush and rabbitbrush. Dense ground cover (70-100%) of alfalfa, yellow sweetclover, numerous forbs and grasses. Pubescent wheatgrass, crested wheatgrass, brome, and others exceed 50% cover in some areas. South area - occasional big sagebrush and rabbitbrush on heavier soils; ground layer average 15% cover (max 40%) w/ diverse mixture of grasses and annual forbs. Dominants are wheatgrasses, smooth brome, yellow and white sweetclover. Land Use: Landfill (dump), wildlife, grazing. Abundant avifauna and mammals, including deer, raccoon, badger, marmot. Salt lick use by wildlife noted.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 22 (Coal)	Colorado	'31-'50 (?)	Mining: Dozer-shovel operation. One pit and spoil dumps surrounding.	Pre-Mining	31,
Rosebud Strip (Inactive)	Jackson County	'58-'60 (?) (10a)	Reclamation: None.	Topography: Sloping high parkland, elev 8300 ft.	54, 39, 101
Owner: G. Walker	Lat 40-33-00N Lon 102-27-00W		Land Use Objectives: Grazing.	Vegetation: Sagebrush steppe w/ big sagebrush, other sages, rabbitbrush, and numerous grasses.	
(Some confusion on mine names)	T7N R81W-S26			Land Use: Grazing.	
	Coalmont (USGS 7.5')			Current	
				Spoils: Age 17-46 yrs (?). 30-ft deep pit surrounded by spoil piles 20 ft high. Slopes 60° in pit and 15° on piles. Heterogeneous mixture of coal and shale w/some clay, fill and gully erosion common. One-acre pond in pit. Evidence of coal fires.	
				Natural Revegetation: Coal and shale areas devoid of vegetation. Clay areas have 10-40% cover of sages and rabbitbrush. Weedy forbs occasionally in ground layer.	
				Land Use: Grazing.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 23 (Coal)	Colorado	'64-'68 (119a)	Mining: Dragline-shovel-truck operation, pit mine.	Pre-Mining	3,
Sonoma Strip No. 2 (Inactive)	Butte County	(119a reclaimed)		Topography: Hilly, elev 7000 ft.	21,
Owner:	Lat 40-30W		Reclamation: Ridge tops graded, '65 to		28,
Peabody Coal Co.	Lon 107-07-30W		'68. Native grasses, legumes, and shrubs		30,
	TSN 887W-82.3,		and trees planted. Wheatgrass, broom,		31,
	10.11		alfalfa and clover aerial broadcast in		32,
			'68. Variety of native and introduced		47,
			shrub and tree seedlings planted in '66.		49,
	Milner				54,
	Mount Harris		Land Use Objectives: Grazing.		76,
	(USGS 7.5')				98,
					119
				Land Use: Grazing.	
				Current	
				Spoils: Age 9-13 yrs.	
				Steep, fairly extensive spoil areas	
				w/variety of slope and aspect condi-	
				tions. Spoils graded by flattening	
				ridge tops to width of 15 ft. Spoils	
				well drained and fairly impermeable.	
				Some water present.	
				Reclamation: Spoils graded, seeded,	
				some shrubs and trees planted. Spoils	
				revegetated fairly well w/alfalfa,	
				smooth broom, wheatgrass, orchard	
				grass and cheatgrass broom dominant	
				soil cover 60-70%. Survival of	
				deciduous shrubs and trees fairly good,	
				conifers less successful. Vegetation	
				scarce on some slopes and rocky area.	
				Land Use: Grazing.	

Table 3. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 24 (Coal)	Colorado	'68-Present	Mining: Dragline-shovel-truck operation, pit mine.	Pre-Mining	3,
Sonaca Strip No. 2 (Operating)	Boutt County	(600a dis- turbed, 450a reclaimed)	Reclamation: Highwall reduced, topsoil stockpiled. Spoils recontoured to hilly terrain (slope 25-33%). Topsoil replaced to depth of 11 in. aerial seeded in spring with mixture of alfalfa, sweetclover, wheatgrasses, brome, timothy and fescue. No amendments, mulch, or irrigation.	Topography: Hilly terrain, elev 7000 ft.	21, 28, 30, 31, 32, 33, 47, 49, 54, 59, 76, 98, 119
Operator: Peabody Coal Co.	Lat 40-27N Lon 107-07-30W T6N R87W-S26, 27, 34, 35 Miller Mount Harris (USGS 7.5')		Land Use Objectives: Grazing.		
				Land Use: Grazing.	
				Current	
				Spoils: Age 0-9 years. Large, extensive areas of graded and top- soiled spoils, slopes and shape near original configuration. Most are well drained, some water present. Spoils of clay, shale, sand- stone.	
				Reclamation: Spoils graded to near original contour, aerial seeded. No areas success- fully revegetated through '76 with native species, but some have good cover of alfalfa. Reports that spoil areas not topsoiled on some locations. Revegetated areas dominated by yellow sweetclover, smooth brome, crested wheatgrass and intermediate wheatgrass. Cover varies 27-34%.	
				Land Use: Grazing, wildlife.	

Table 3. (continued)

Mine	Location	Dates and Acres(s) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 25 (Coal)	Colorado	'60 (15a)	Mining: Small operation, several strip areas of spoils approx 5a each.	Pre-Mining	31, 54, 99
Superior Strip (Inactive)	Fremont County Lat 38-17-40N Lon 105-08W		Reclamation: None.	Topography: Alluvial valley, hilly terrain, elev 6000 ft.	
Owner: Unknown	T20S R69W-S19		Land Use Objectives: Unknown	Vegetation: Juniper-Pinyon Woodland. Pinyon, juniper and oak brush w/ blue grama and buffalograss.	
	Rockvale (USGS 7.5')			Land Use: Grazing.	
				Current	
				Spoils: Age 17 yrs. Spoil piles and ridges not reduced, ever- age slope 30°, ridges to 30 ft. Soils of clay and gravel w/stones. Streams and ponds present in low areas, some erosion on clay spoils.	
				Natural Vegetation: Highly varied cover. Fremont cottonwood along ponds. Shrub layer of oak, pinyon, juniper, skunkbush, and rabbitbrush, cover 5%. Some shrubs well developed. Ground layer generally sparse, cover avg 5%. Indian ricegrass and cheatgrass. One area has well-established ground layer.	
				Land Use: Grazing.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 26 (Coal)	Colorado	'75-'76 (40a)	Mining: Two pits. Pit 1: dragline, Pit 2: loader-truck-shovel.	Pre-Mining	26,
Williams Fork Strip (Operating)	Moffat County Lat 40-25-10N Lon 107-36-45W	'77 (reclaim- ing)	Reclamation: Stockpile topsoil, reduce highwall, restore hilly contour. Top- soil, drill grasses and legumes (crested wheatgrass, strawband wheatgrass, pubescent wheatgrass, Russian wildrye, sweetclover, milkvetch, green needlegrass, Indian ricegrass, sand dropseed), plant shrubs and trees. Runoff control structure.	Topography: Foothills and alluvial valley, elev 6200 ft. Vegetation: Sagebrush Steppe. Cropland.	30, 31, 32, 47, 54, 102
Operator: Empire Energy Company	T5N R91W-S6 T6N R91W-S30, 31,32 Round Bottom (USGS 7.5')			Land Use: Cropland. Current	
			Land Use Objectives: Grazing and cropland.	Spoils: Age 1-2 yrs. All have been regraded as specified.	
				Reclamation: Will be conducted as specified starting in '77.	
				Land Use: Idle.	

Table 3. (continued)

Mine	Location	Dates and Acreage of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 27 (Uranium)	Colorado	'55-'64 (50a+)	Mining: Dozer and truck-shovel. Spoils removed from pit and piled. Some additional disturbance will be conducted in pit bottom.	Pre-Mining Topography: Rolling upland, elev 5500 ft.	94, 65, 96, 99
Maybell Operations Gerrards Pit (Inactive)	Neftat County Lat 40-34N Lon 107-59W	'75 some redisturbance.	Reclamation: None in past. Future plan under development to comply w/ state regulations. Land Use Objectives: Grazing.	Vegetation: Sagebrush steppe. Big sagebrush and rabbitbrush of approximately 60% cover w/occasional western wheatgrass, Indian ricegrass, crested wheatgrass, and others. Land Use: Grazing, hunting.	
Owner: Union Carbide Corp.	T7N R40W-S17 14y (USGS 7.5')			Current Spoils: Age 13-22 yrs. Long trench w/numerous side excavations and surrounded by varied spoil dumps. Slopes 60-80° on pit walls and 10-50° on dumps. Sandstone, sands, and loamy sands. Wind and gully erosion evident and dune-like sand accumulations on pit floor. Reclamation: None completed to date. Natural Reclamation: Sandstone cliffs barren but sandy areas of 45° slope extensively colonized with up to 20% shrub cover of big sagebrush, rabbitbrush, and occasional mountain mahogany. A 10-50% herbaceous cover varies w/ varied moisture conditions and includes crested wheatgrass, Indian ricegrass, yellow sweet-clover and numerous small herbs and immature grasses. The dune-like pit floor has 10-50% grass cover dominated by Indian ricegrass. Land Use: Grazing, hunting, motorcycles. Signs of coyote, male deer, and jack rabbit.	

Table 3. (continued)

Mine	Location	Dates and Areas (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 28 (Uranium)	Colorado Boulder County	'58-'62 (30a) 15a pit 15a spoil dump	Mining: Dozer and truck-shovel operation. Spoils removed from pit and placed in dumps surrounding pit. Considerable expansion anticipated.	<u>Pre-Mining</u> <u>Topography:</u> Rolling upland, elev 6300 ft. <u>Vegetation:</u> Sagebrush steppe. Big sagebrush and rabbitbrush of approx- imately 60% cover w/occasional western wheatgrass, Indian ricegrass, crested wheatgrass and others.	54, 65, 96
Maybell Operation Johnson Pit (Inactive)	Lat 40-32-30N Lon 107-59W	'77-'80 There will be considerable expansion.	Reclamation: None in past. Future plan under development to comply w/ state regulations.	<u>Land Use:</u> Grazing, hunting.	
Owner: Union Carbide Corp.	T78 8948-219 Lay (USGS 7.5')		<u>Land Use Objectives:</u> Partial backfill of pit as new development progresses.	<u>Current</u> <u>Spoils:</u> Age 15-19 yrs. Similar to other Maybell pits (not visited). <u>Reclamation:</u> None completed to date. <u>Natural Revegetation:</u> Similar to other Maybell pits (not visited).	
				<u>Land Use:</u> Similar to other Maybell pits.	

Table 3. (continued)

Mine	Location	Dates and Areas (a) of Disturbance	Mineral and Reclamation Plans	Pre-mining and Current Conditions	Information Sources
CO 29 (Uranium)	Colorado	'55-'64 (20a)	Mineral: Lessor and truck-shovel operation. Spoils removed from pit and piled. Back-filling some of pit in '77 and reworking spoil dumps.	Pre-mining Topography: Rolling upland, elev 6,300 ft.	54, 63, 84, 99
Maybell Operation Barge Pit (Operating)	LaSalle County Lat 40-138 Lon 108-508	'75-'77 some redisturbance in pit bottom and reworking of spoil dumps.	Reclamation: None in past. Future plan under development to comply w/state regulations. Land Use Objectives: Recreational area for off-the-road vehicles and motor bikes.	Vegetation: Sagebrush steppe, sagebrush and rabbitbrush of approximately 60% cover w/ occasional western wheatgrass, grass, Indian ricegrass, crested wheat and others.	
Operator: Union Carbide Corp.	77N 8048-818, 19 77N 8058-813, 24				
Lay (USGS 7.5')					
<u>Current</u>					
Spoils: Age 0-2, 13-22 yrs. Deep pit (100 ft) with vertical terraced sandstone cliffs. Bio-sand has accumulated on terraces. Pit floor, recently disturbed, still contains a 6.1a pond. Sandy sp. dumps currently being reworked. Wind, gully erosion evident.					
Reclamation: None completed to date.					
Natural Vegetation: Sandstone cliffs of pit barren. Sandy terraces w/ occasional big sagebrush and rabbitbrush and a grass cover of 10-30% dominated by Indian ricegrass. Spoil dumps barren due to active disturbance, w/big sagebrush, disturbed rabbitbrush, and grasses on undisturbed areas.					
Land Use: Idle, wildlife. Local avifauna present in pit.					

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
CO 30 (Uranium)	Colorado	'61-'64 (25a)	Mining: Dozer and truck-shovel operation. Spoils removed from pit and piled. Some additional mining will occur in pit bottom and expansion may occur.	Pre-Mining Topography: Rolling upland, elev 4300 ft. Vegetation: Sagebrush Steppe. Big sagebrush and rabbitbrush of approximately 60% cover w/occasional western wheatgrass, Indian ricegrass, crested wheatgrass, and others.	54, 65, 96, 99
Maybell Operation Rob Rollo Pit (Inactive)	Lat 40-33N Lon 108-01W	'75-some redisturbance	Reclamation: None in past. Future plan under development to comply w/state regulations.	Land Use: Grazing, hunting.	
Owner: Union Carbide Corp.	T7N R94W-S19 T7N R95W-S25	'77-'80 possible expansion	Land Use Objectives: Recreational area for off the road vehicles and motor bikes.	<u>Current</u> Spoils: Age 2, 13-16 yrs. 60 ft deep trench and pit with vertical sandstone walls and a small pond. Spoil dumps to 50 ft high surround pit. Dumps of sand, vary from level to 45° slope, and dune-like. Wind erosion common and gully erosion evident. <u>Reclamation:</u> None completed to date. Natural Revegetation: Sandstone cliffs barren. Moist areas surrounding pond have 60% ground-layer cover of foxtail bailey, cattail, and small tamarisk. Accumulations of windblown sand in the pit support grass stands of Indian ricegrass and thickspike wheatgrass w/cover of 5-40% (avg. 10%) depending on moisture. Spoil dumps have 20-60% shrub cover of big sagebrush and rabbitbrush w/scattered grasses of the surroundings. Recent wind deposits of sand support wheatgrasses and Indian ricegrass at 0-20% cover. Land Use: Grazing, wildlife, process- water source.	
	Maybell (USGS 15')				

Table 3. (continued)

Mine	Location	Dates and Acres (a)		Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
		of Disturbance	'59-'64 (35a)			
CO 31 (Uranium)	Colorado		'76-some	Mining: Dozer and truck/shovel operation. Spoils removed from pit and spread surrounding pit.	Pre-Mining Topography: Rolling upland, elev 6600 ft.	54, 65, 96, 99
Maybell Operation Sage Buella Pit (Inactive)	Lat 40-34N Lon 107-59W	redisturbance in pit bottom.		Reclamation: None in past. Future plan under development to comply w/ state regulations.	Vegetation: Sagebrush Steppe. Big sagebrush and rabbitbrush of approximately 60% cover w/ occasional western wheatgrass, Indian ricegrass, crested wheatgrass, and others.	
Owner: Union Carbide Corp.	T7N R94W-S7,8 Lay (USGS 7.5')			Land Use Objectives: Not set.	Land Use: Grazing, hunting.	
					Current Spoils: Age 2, 13-18 yrs. 40 ft deep pit w/80° walls of sandstone and shale. Spoil dumps of sand, gravel, rocks, and shale were low, widely spread, and the limits difficult to discern. Conditions highly varied.	
					Reclamation: None. Natural Revegetation: The pit floor and walls are essentially barren except for occasional big sagebrush following one strata along the north wall and 10-20% cover of grass (dominant Indian ricegrass) on sandy terraces. Spoil dumps are varied w/barren areas of rock and shale, sandy areas of western wheatgrass and needleandthread, and older areas of big sagebrush and rabbitbrush resembling undisturbed vegetation.	
					Land Use: Grazing, motorcycles, wildlife. Golden eagle roosting usage.	

TABLE 4
NORTHERN GREAT PLAINS REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR COAL AND PHOSPHATE PRIOR TO 1976 IN MONTANA

Table 4.

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 1 (Coal)	Montana	'70-present (580a)	Mining: Pit operation, dragline used. Highwall reduced.	Pre-Mining	28, 47,
Big Sky Mine (Operating)	Rosebud County	'70-73 (176a mined, 211a total disturbance)	Reclamation: Spoils graded to gentle slopes, max 5:1, contours restored.	Topography: Rolling terrain, elev 3220 ft.	54, 59, 63,
Operator: Peabody Coal Company	Lat 45-48N Lon 106-37W T1N R41E-S15, 21,22,27 Coalstrip SE (USGS 7.5')	'73-'77 (256a mined, 580a total disturb- ance)	Spoils topsoiled, no amendments or mulch, irrigation when appropriate during first year. Native grasses, legumes, shrubs drill seeded.	Vegetation: Eastern Ponderosa Forest, 76, Grama-Needlegrass-Wheatgrass. Silver sage, needleandthread, wheatgrasses, and blue grama dominant.	76, 152, 179
			Land Use Objectives: Grazing.	Land Use: Grazing.	
				Current	
				Spoils: Age 0-7 yrs. Spoil areas fairly extensive, graded to near natural terrain w/slopes less than 3:1. Surface varied, topsoiled w/some shale exposed. Well drained; ponds present. Some gully erosion.	
				Reclamation: Spoils graded, topsoiled, and drill seeded w/native grasses; some shrubs and trees also planted. To '77 114a seeded; spoils mined prior to '71 not reclaimed. Reclaimed area w/varied vegetation cover. Thicksipke, western and crested wheatgrasses, smooth brome, alfalfa and sweetclover dominant. Cover varies 5-40%, Russian thistle prominent in some areas. Some litter development on '74 and '75 spoils.	
				Land Use: Grazing, wildlife.	

Table 4. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 2 (Coal)	Montana	'30-'38 (1000a)	Mining: Strip mine.	<u>Pre-Mining</u>	28, 47,
Burlington Northern Colstrip Mine (Inactive)	Colstrip County Lat 45-52N Lon 106-36W	'72 (850a reclaimed)	Reclamation: In '72 850a spoils reclaimed. Spoil slopes reduced to an avg of 20° or less and drill seeded w/slender wheatgrass, crested wheatgrass, and yellow sweet- clover.	Topography: Hilley terrain, elev 3400 ft.	54, 63, 99,
Owner:	T2N R41E-S26, 34,35			Vegetation: Eastern Ponderosa Forest. Scattered ponderosa pines and big sagebrush, and western wheatgrass.	115, 152
Burlington Northern Railroad	T1N R41E-S2, 3,4,12 Colstrip E,SE (USGS 7.5')		Land Use Objectives: Unknown.	Land Use: Grazing.	
				<u>Current</u>	
				Spoils: Age 5-47 yrs. Mostly long linear spoils w/slopes ranging from level to 45°; reclaimed areas mostly w/20° slopes. Well- drained sandy substrate; steep slopes gully eroded.	
				Natural Revegetation: 1932 "Cape Oliver Spoils" (18a of level spoils): Ponderosa pine and juniper are the dominant tree species (5% cover), rabbitbrush, yucca, fringed sage, and snowberry dominate the shrub stratum (<10% cover), and blue- bunch wheatgrass, junegrass, needleandthread and Japanese brome dominate the ground layer stratum (plant cover 35%, litter 60% cover). Natural revegetation on steep slopes (20°-40°) has a ground layer cover of 5%. Indian ricegrass associated w/ summercypress and Russiianthistle dominates.	
				Reclamation: Spoil manipulation and planting as described under plan. Crested wheatgrass and yellow sweetclover dominate the ground layer (plant cover 25%, litter cover 50%). In some area, cottonwoods are present at the base of spoils.	
				Land Use: Idle.	

Table 4. (continued)

Mine	Location	Dates and Acres(s) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 3 (Coal)	Montana	'71-'72 (18a)	Mining: Wheeled scraper operation. Pit mine. Spoils placed adjacent to pit. Steep slopes left on spoil piles for reclamation experiment.	Pre-Mining	54,
Consol Test Pit (Inactive)	Musselshell County	total reclama- tion project, 7.4 of this in experiment on reclaimed spoils)	Reclamation: Doze spoils to variety of slopes. Reserve all topsoil (including that on spoil dump) and replace upon spoils to various depths and amend in selected areas w/fertilizer and/or mulch. Drillseed, broadcast, and/or hand plant grasses, forbs and trees on diversified slopes and topsoil depths. Protect experimental area from cattle and wildlife by fencing.	Topography: Hilly terrain, elev 3700 ft.	55, 63, 99, 114
Owner: Consolidated Coal Co.	Lat 48-26N Lon 108-27W T8N R26E-S33 Roundup (USGS 1:250,000)		Seed mixture: green needlegrass, western wheatgrass, pubescent wheatgrass, sweetclover, streambank wheatgrass, Russianthistle, vetch, orchard grass, smooth brome, tall wheatgrass, intermediate wheatgrass, canary reedgrass, crested wheatgrass, fourwing saltbush, and other species. Ponderosa pine hand planted.	Vegetation: Eastern Ponderosa Forest. W/ponderosa pine, blue- bunch wheatgrass, blue grama, and skunkbush. <u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age 5-6 yrs. Varied spoils w/slopes ranging from 0-14:1 and surface material varying from topsoil to sands or shale. Gully erosion present on steeper slopes. Reclamation: Spoils treated as in plan. Vegetation composition and density varied w/slope, exposure, and substrate. North-facing slopes w/topsoil dominated by smooth brome (plant cover 50%, litter 50%). More xeric exposures and those w/out top- soil dominated by crested wheatgrass (<1 to 35% cover). Scattered occur- rence of fourwing saltbush in areas lacking topsoil (<1% cover).	
			<u>Land Use Objectives:</u> Grazing.	Land Use: Protected; reclamation test area.	

Table 4. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 4 (Coal)	Montana	'72-Present (475a total, 115a reclaimed)	Mining: Dragline-scraper operation, one large, continuous pit. Maximum pit depth 150 ft. Highwall reduced, problem strata segregated, topsoil stockpiled.	Pre-Mining Topography: Rolling terrain, elev 3750 ft.	26, 32, 50, 54, 76, 179
Decher Mine (operating)	Lat 45-08N Lon 106-49W		Reclamation: Spoils graded to near natural terrain, maximum slope 4:1. Spoils topsoiled, mulched, amendments added, no irrigation. Primarily seeded with native grasses, some legumes, shrubs, and trees. Seed mixture: western wheatgrass, thickspike wheatgrass, slender wheatgrass, whitman wheatgrass, green needlegrass, prairie sandreed, blue grama, smooth brome, fourwing saltbush.	Vegetation: Grama-Needlegrass-Wheatgrass. Big sagebrush w/prairie sandreed, blue grama, needleandthread, Sandberg bluegrass and junegrass. Cover 20-30%. Some areas with black greasewood, blue grama, bluegrass, bluestem wheatgrass; cover to 47%.	
Operator: Decher Coal Co.	T9SS R40E-S15,16 Decker (USGS 7.5')			Land Use: Grazing. Current Spoils: Age 0-5 yrs. Large spoil areas, graded to near natural terrain, gently rolling areas. Spoils topsoiled, surface material smooth, composed of sandy loam. General depth of topsoil 18-24 in. No significant erosion problems. Reclamation: Spoils graded, topsoiled, disced and harrowed. Fertilizer added, areas drillseeded and hydromulched with forest fiber. Some experimental plantings. Revegetation appears fairly successful, although too early for conclusive statement. Areas primarily dominated by slender, western, thickspike and crested wheatgrasses, and smooth brome. Cover varies from fairly uniform, 25% to variable, 10%.	
			Land Use Objectives: Grazing.	Land Use: Protected, idle.	

Table 4. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 5 (Coal) Divide Mine (Operating) Operator: Divide Mining Company	Montana Russellshell Co. Lat 46-15N Lon 108-19W T6N R26E-S24 Roundup (USGS 1:250,000)	'72-present (Approx 10a disturbed, 24a proposed for total reclamation)	Mining: Contour mining operation. Strip and backfill spoils in previous cuts. Reclamation: Final highwall to be blasted such that no slope is >30°. Seed for grazing and wildlife. Land Use Objectives: Grazing and wildlife.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 8400 ft. Vegetation: Eastern Ponderosa Forest. Land Use: Grazing. <u>Current</u> Spoils: Age 0-5 yrs. Reclamation: Unknown. Land Use: Mining.	47, 54, 59, 63

Table 4. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 6 (Coal)	Montana	'72-present	Mining: Area mining w/wheeled scrapers, spoil backfilled. Mining disturbs approx. 2a per year. Recently have had trouble w/water in the cut.	<u>Pre-Mining</u>	47,
P & M Mine (Operating)	Musselshell County Lat 45-50N Lon 108-18W	(20a-10a old mine, pre-'76, 10a active mine)		<u>Topography:</u> Gently undulating terrain, elev 3700 ft.	54, 59, 63
Operator: P & M Coal Co.	T68 R26E-S13 Roundup (USGS 1:250,000)		Reclamation: Recontour to original configuration w/no slopes >1:1. Drillseed grass-legume mixture to produce hay or pasture for Meged Bunch. No reclamation done as of '76.	<u>Vegetation:</u> Eastern Ponderosa Forest. <u>Land Use:</u> Grazing. <u>Current</u>	
			<u>Land Use Objectives:</u> Grazing.	<u>Spoils:</u> Age 0-5 yrs. <u>Reclamation:</u> Unknown.	
				<u>Land Use:</u> Mining, grazing, and wildlife.	

Table 4. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 7 (Coal)	Montana Rosebud County	'73-present (1720a total, 700a pits, 1020a reclaimed)	Mining: Extensive open pit operation, extended bench system w/ dragline and spiral pit. Overburden backfilled into previously mined pit. Two main pit areas. Highway reduced.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 3400 ft. Vegetation: Eastern Ponderosa Forest. Scattered ponderosa pine w/big sagebrush, rabbitbrush and western wheat grass. <u>Land Use:</u> Grazing.	28, 47, 54, 63, 76, 99, 115, 152, 179
Operator Western Energy Company	T1N R42E-S10,18 T1N R41E-S14,12,13 T2N R41E-S11,14 Colstrip E Colstrip SE (USGS 7.5')		Reclamation: Contour spoils to slopes 5:1, bury problem strata, topsoil, and disc, fertilizer, mulch if necessary, no irrigation. Drill seed or aerial broadcast seed mixture including native wheatgrasses, needlegrass, sandreed, smooth brome, grama, sweetclover and fourwing saltbush. <u>Land Use Objectives:</u> Grazing.	<u>Current</u> Spoils: Age 0-53 yrs. Spoils mined since '73 graded to gentle slopes. 73:1, topsoiled. Surface material sandy loam, some water in low areas, wind erosion. Adjacent old spoils not reclaimed to date; large, abandoned, steep-sloped spoils (See MT 2). Reclamation: Spoils graded, topsoiled and seeded. Current vegetation includes good cover and litter accumulation in meadow basins, smooth brome, dominant, 40% cover. Upland areas composed of tall and crested wheat grasses, Indian ricegrass and others, cover 25%. Some research plots w/Montana State University. <u>Land Use:</u> Protected, idle.	

Table 4. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NT 8 (Coal)	Montana	'74-present (344a total, 134a reclaimed)	Mining: Dragline-scraper-dozzer operation, 1 pit. Highway reduced. Reclamation: Grade spoils to approximate original contours, slope 3:1. Topsoil, fertilize, drill and broadcast seed native grasses, legumes, shrubs. Yellow sweetclover or wheat used as nurse crop.	<u>Pre-Mining</u> Topography: Gently sloping terrain, elev 3500 ft. Vegetation: Eastern Ponderosa Forest and Wheatgrass-Needlegrass. <u>Land Use</u> : Grazing, crop production.	28, 32, 54, 76, 79
Sarpy Creek Mine (Absaloka) (Operating)	Big Horn County Lat 45-48N Lon 107-04W			<u>Current</u> Spoils: Age 0-3 yrs. Gently rolling spoils w/topsoiled surface. Reclamation: Vegetation cover varied (4-22%); slender wheatgrass associated w/other wheatgrasses dominate most sites.	
Operator: Westmoreland Coal Company	T1N R37E-S23, 25.26 Hardin (USGS 1:250,000)		<u>Land Use Objectives</u> : Unknown.	<u>Land Use</u> : Unknown.	

Table 4. (continued)

Mine	Location	Dates and Acreage of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 9 (Coal)	Montana				
Savage Mine (Operating)	Richland County	*50-percent (700a total, 450a reclaimed)	Mining: Dragline-doser operation. 1 pit, highwall reduced. Reclamation: Problem strata not segregated, spoils doped to max 3:1 slope, topsoiled. Fertilizer and mulch added; no irrigation. Native grasses, legumes, shrubs drilled seeded. Some experimental grazing-vegetation studies.	<u>Pre-Mining</u> Topography: Gently sloping terrain, elev 2150 ft. Vegetation: Wheatgrass-Needlegrass. Rangeland dominated by western wheatgrass, slender wheatgrass, green needlegrass, and prairie sandreed.	28, 32, 54, 79
Operator: Knife River Coal Company	Lat 47-20N Lon 104-25W T10N R57E-022,27 Knife River Mine (USGS 7.5')		<u>Land Use Objectives:</u> Unknown.	<u>Current</u> Spoils: Age 0-27 yrs. Overburden is sandy loam and silt loam. Surface substrate of spoils that have been topsoiled ranges from loam to sandy loam. Reclamation: Several species of trees are established successfully in experimental plots. Excellent stands of both introduced and native grasses developed.	
				<u>Land Use:</u> Unknown.	

Table 4. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-mining and Current Conditions	Information Sources
MT 10 (Coal) Square Deal Mine (Inactive) (Owner: BLM)	Montana Russellville County Lat 46-2'N Lon 120-21'W T10N R25E-21E Roundup (USGS 1:250,000)	1971-1973 (11a)	Mining: Pit mined by dozer-scraper operation; spoil back-filled into pit. Reclamation: Spoils graded to a 5:1 slope and covered w/4-6 in. of soil material. Residual waters: wheatgrass, green needlegrass, fourwing saltbush, slender wheatgrass, and yellow sweet- clover were seeded w/a double-disc drill and cultivated. Site fertilized w/manure.	Pre-mining Topography: Hilly terrain, elev 3700 ft. Vegetation: Eastern Ponderosa Forest. W/dominants including ponderosa pine, skunkbush, blue bunch wheatgrass, western wheat- grass, and blue grass. Land Use: Grazing. Current	34, 55, 59, 63, 99, 118
			Land Use Objectives: Grazing.	Spoils: Age 4-6 yrs. 11a rectangular area; well-drained soil material w/10-15% slope. Reclamation: Spoils treated as in plan 10-773. Ground layer cover composed primarily of western wheat- grass and green needlegrass is approx. 25%. Fourwing saltbush provides approx. 15% shrub stratum cover. Land Use: Currently idle; mule deer and turkeys sighted.	

Table 4. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-mining and Current Conditions	Information Sources
MT 11 (Phosphate)	Montana	'55-'61 (between 10 and 20a)	Mining: Scraper-digger operation in several parallel bench cuts. Surface and underground operation. Underground phosphate mine (largest in western U.S.) closed '72.	Pre-mining	54, 56, 61, 99, 148
Anderson Mine (Inactive)	Lat 46-53N Lon 112-53W		Reclamation: None.	Topography: Billy Terrace, elev 5500 ft. Vegetation: Douglas Fir Forest. Dominated by Douglas fir w/sum lodgepole pine.	
Omni- Cimino Mining and BLM	T10N R10E-S2,3 Garrison (USGS 15')		Land Use Objectives: Unknown.	Land Use: Wildlife. Current Spills: Age 16-22 yrs. A series of benches and vertical cuts on the 25-35° slope. Well- drained gravel, rocks, various- sized boulders. No apparent erosion. Natural Vegetation: Plant colonization restricted primarily to gravel (as opposed to coarser material). Occasional quaking aspen, cottonwood, Douglas fir, and lodge- pole pine provide 5% cover. Shrubs composed of rabbitbrush, ceanothus, gooseberry, sage and bramble provide cover up to 80% (10-15% average). Important ground layer species are slender wheatgrass, miloia and erigeron (about 5% cover). Land Use: Grazing and wildlife; elk and deer common.	

Table 4. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 12 (Phosphate) Centennial Mine (Inactive)	Montana Beaverhead County	'55-'60 (>10a)	Mining: Doser operation in series of pits after overburden scraped off. Combined underground and surface methods.	Pre-Mining Topography: Steep vertical walls, elev 9000-10,000 ft.	54, 56, 99, 148
Owner: J. R. Simplot Co.	Idaho Fremont County		Reclamation: None.	Vegetation: Douglas Fir Forest.	
	Lat 44-56N Lon 111-69W		Land Use Objectives: Wildlife.	Land Use: Unknown.	
	T14S R01W (MT) T14N R40,41W (ID)			Current	
	Upper Red Rock Lake (USGS 1:250,000)			Spoils: Age 17-22 yrs. Spoils very rocky; extensive unreduced highwalls.	
				Natural Revegetation: Ground cover highly varied. Douglas fir and slender wheatgrass common invaders.	
				Land Use: Primitive area.	

Table 4. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MT 13 (Phosphate)	Montana Powell County	'68-'75 (12a)	Mining: Dragline and dozer operation, parallel box cuts along steep hill. Reclamation: In '78 replace spoils in cuts, blade to original contour and seed w/western wheatgrass, slender wheatgrass and thickspike wheatgrass. Land Use Objectives: Grazing.	<u>Pre-Mining</u> Topography: Steep west-facing hillside, elev 5600 ft. Vegetation: Douglas Fir Forest. Scattered Douglas fir w/inrequent ponderosa pine in canopy. Shrub layer composed chiefly of creeping juniper w/scarce interspersions of mountain mahogany. Ground layer dominated by bluebunch wheatgrass, Canada bluegrass, and balsam root.	54, 56, 99, 148
Owner: State of Montana	T9N R6W-S6 T9N R7W-S1 Elliston (USGS 15')			<u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age 2-9 yrs. Dumped downhill from large primary box cut and smaller secondary cuts above. Spoils mostly level benches at base of vertical cuts composed of rough rocks and gravel. Well drained. Natural Revegetation: Composed of roses and blackberry providing <1% cover. Ground layer of Japanese brome, slender wheatgrass, mullein, and bull thistle. Ground cover approx. 15% on '70 spoils and <1% on '74 spoils. Land Use: Grazing; area utilized by wildlife, mule deer sighted.	

TABLE 5
NORTHERN GREAT PLAINS REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR COAL AND URANIUM PRIOR TO 1976 IN NORTH DAKOTA

Table 5.

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 1 (Coal)	North Dakota	'33-'29	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54, 120,
Albrecht Mine (Inactive)	Hettinger County	'33-'44 (24a)	<u>Reclamation</u> : None.	<u>Topography</u> : Rolling terrain, elev 2600 ft.	121, 122, 133
Owner: M. Albrecht	Lat 46-34N Lon 102-45W		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
	T136N R96W-S33			<u>Land Use</u> : Unknown.	
	Dickinson			<u>Current</u>	
	(USGS 1:250,000)			<u>Spoils</u> : Age 33-44, 48-54 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 2 (Coal)	North Dakota Adams County	'36-'74 (¹ '36-'69 140a, ² '70-'74 24a)	Mining: Early mining was a strip operation and later mining was contour mining. Reclamation: Overburden material to be replaced in cut when possible, recontoured and seeded. <u>Land Use Objectives:</u> Grazing.	<u>Pre-Mining</u> Topography: Rolling to hilly terrain, elev 2700 ft. Vegetation: Wheatgrass-Needlegrass, Western wheatgrass and blue grama dominated prairie. <u>Land Use:</u> Grazing and crop production.	54, 99, 120, 121, 123, 124, 136
Owner: D. Papke	T129 R94W T129 R95W Dickinson (USGS 1:250,000)			<u>Current</u> Spoils: 3-41 yrs. Older spoils are steep ridges w/slopes frequently 45°; newer spoils are situated downhill from the contour cut and have slopes from 0-20°. Spoil material primarily loam w/occasional shaley sites. <u>Reclamation:</u> Has not been conducted to date. Natural Revegetation: Steep spoils in stripped area mostly barren (cover <1%); spoils dominated by crested wheatgrass, Russian thistle and sumac. Less steeply sloping spoils, located in the more recently mined site colonized, in order of decreasing importance, by: blue grama, western wheatgrass, crested wheatgrass, curlycup quince, and Russian thistle. The order of importance by the above species is reversed from older to newer spoils. <u>Land Use:</u> Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 3 (Coal)	North Dakota	'23 - present	Mining: Pit operation, dragline used.	Pre-Mining	28,
Beulah (North & South)	Oliver County	(286a inactive,	Maximum pit depth 90 ft, average 40 ft.	Topography: Hilly terrain, elev 2000 ft.	29,
(Operating)	Mercer County	950a active, reclamation in progress in both)			54,
	Lat 47-15N				79,
	Lon 101-47W				123,
Operator:			Reclamation: Spoils recontoured, topsoiled, and seeded w/native and introduced grasses and legumes; portions of proposed plan include tree plantings and where possible water diversions.	Vegetation: Wheatgrass-headgrass. Range dominated by smooth brom and created wheatgrass.	124,
Knife River Coal Mining Company				Land Use: Grazing and agriculture.	125
	T143N R87W-S6, 7			Current	
	8, 16			Spoils: Age 0-54 yrs, High sodium content at toxic level.	
	T143N R89W-S1, 2, 11, 12, 13, 14			Reclamation: 66a were reclaimed as of June 1977. Future mined areas will be returned to agriculture.	
	T144N R87W-S8, 9, 16, 17			Spoils graded on some portions of mine in north and south. Successful seeding of both introduced and native grasses and legumes on spoil material within approx 10 ft of ground surface or spoils dressed with surface soil.	
	T144N R89W-S12			Natural Revegetation: Spoils dominated by Russian thistle and tenpetal monticola; cover <30%.	
	Beulah, Medicine Butte NE (USGS 7.5')		Land Use Objectives: Pasture, forest, recreation, and wildlife habitat.	Land Use: Mining, wildlife habitat and fishing.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 4 (Coal)	North Dakota Burke County	'38-'42 (5230a)	<u>Mining</u> : Unknown. <u>Reclamation</u> : None. <u>Land Use Objectives</u> : Unknown.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 2000 ft. Vegetation: Wheatgrass-Bluestem- Needlegrass. <u>Land Use</u> : Unknown. <u>Current</u> Spoils: Age 35-39 yrs. <u>Natural Revegetation</u> : Unknown. <u>Land Use</u> : Unknown.	54, 120, 121, 122, 129
Blank Bros. (Inactive)	Lat 48-52N Lon 102-54W				
Owner: Consolidation Coal Co.	T162N R94W-S8, 9 Columbus, MN (USGS 7.5')				

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 5 (Coal)	North Dakota	'45-'70	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54,
Burns & Wetzling (Inactive)	McLean County	(70a)	<u>Reclamation</u> : None.	<u>Topography</u> : Rolling terrain, elev 2000 ft.	120, 121, 122, 127
<u>Owner</u> :	Lat 47-36N Lon 101-32W		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
O. Ellison	T14EN R86N-S16			<u>Land Use</u> : Unknown.	
	Emmet NE			<u>Current</u>	
	(USGS 7.5')			<u>Spoils</u> : Age 7-32 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Sanitary Landfill.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 6 (Coal)	North Dakota Oliver County	'70 - Present (444a inactive, 650a active, in reclamation progress on both)	Mining: Pit operation, dragline used. Pit width - 120 ft. Reclamation: Spoils graded to original contour. Drill seed grass-legume mixture.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 2000 ft. Vegetation: Wheatgrass-Needlegrass pasture dominated by swollen bluegrass and needleandthread. <u>Land Use:</u> Grazing and agriculture.	28, 29, 34, 35, 79, 121, 123, 124, 125
Center Mine (Operating)	Lat 47-04N Lon 101-17W		<u>Land Use Objectives:</u> Grazing and agricultural.	<u>Current</u> Spoils: Age 0-7 yrs. Soil is loamy, sandy or shaley overburden. Reclamation: 63a completely reclaimed, 450 trees per acre on land to be forested, 40-50 trees per acre on random-clump plantings. Planting success of grasses and legumes, including western wheatgrass, big and little bluestem, sweetclover, and crown vetch, is generally good.	
Operator: Baukol-Hoonan Inc.	T142N R84W-S23, 24, 25, 26, 25, 30 T142N R83W-S30, 31 T141N R84W-S1			<u>Land Use:</u> Mining.	
	Center (USGS 7.5')				

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 7 (Coal)	North Dakota	'20-'15	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	34,
Coffin Butte	Grant County	'48-'70	<u>Reclamation</u> : Unknown.	<u>Topography</u> : Rolling terrain,	120,
(Inactive)	Lat 46-12N	(25-30a)	<u>Land Use Objectives</u> : Unknown.	elev 2400 ft.	121,
Owner:	Lon 101-55W			<u>Vegetation</u> : Wheatgrass-Soodgrass.	122,
Burlington	T132N R90W-S35			<u>Land Use</u> : Unknown.	126
Northern	T134N R90W-S34			<u>Current</u>	
Railroad	New Leipzig South			<u>Spoils</u> : Age 7-29, 42-57 yrs.	
	(USGS 7.5')			<u>Natural Regeneration</u> : Unknown.	
				<u>Land Use</u> : Agricultural.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 8 (Coal)	North Dakota Burke County	'23-'70 (1700a)	Mining: Unknown. Reclamation: None. Land Use Objectives: Unknown.	Pre-Mining Topography: Hilly terrain, elev 2000 ft. Vegetation: Wheatgrass-Bluestem- Needlegrass. Land Use: Unknown. Current Soils: Age 7-54 yrs. Natural Vegetation: Unknown. Land Use: Unknown.	54, 120, 121, 122, 129
Owners: Baukal-Moonan Co. L. Bonness Continental Oil Co. V. Dallen J. Dollard A. Hamer R. Krough D. Kruse S. McCarthy S. Wickey J. Twister	T162N R94W-S14, 23, 26 T162N R93W-S19 T162N R93W-S20 T162N R93W-S29, 30, 21, 28. T162N R94W-S8, 9 Columbus SE (USGS 7.5')				

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 9 (Coal)	North Dakota McLean County	'47-'64 (450a)	<u>Mining:</u> Strip mining.	<u>Pre-Mining</u>	29, 34, 99, 120, 121, 122
Custer Mine (Reclaimed)	Lat 47-40N Lon 101-13W		<u>Reclamation:</u> Since the 1940's local groups have planted trees and shrubs, including pine, Russian olive, Siberian elm, and chokeberry, from stock provided by state, federal, and local agencies. Sweetclover and grass seedlings have been aerially seeded.	<u>Topography:</u> Rolling terrain, elev 1900 ft. <u>Vegetation:</u> Wheatgrass-Budlegrass. <u>Crop production:</u>	
Owner: Consolidation Coal Co.	T140N R63W-21E, 19 Colocharner (T140N 25')		<u>Land Use Objectives:</u> Unknown.	<u>Land Use:</u> Crop production. <u>Current</u> <u>Spills:</u> Age 13-30 yrs. Ridge and trough topography w/ave. 20 ft relief. Spoil ridges are well-drained loam; troughs occasionally w/standing water. <u>Reclamation:</u> Fairly dense and fairly uniform ground layer cover (ave. 375%) dominated by smooth brome associated w/yellow sweetclover. Combined tree and shrub cover ranges from 61% to 75% cover by mixed or pure stands of pine, Siberian elm, Russian olive and chokeberry and other species. <u>Natural Vegetation:</u> Common species that were not planted in the reclamation program include cattail, bulrush, and willows, in wet areas, and cottonwood. <u>Land Use:</u> State game management area open to public; wildlife reported from site include deer, fox, pheasant, and waterfowl.	

(continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 10 (Coal)	North Dakota	'34-'35	Mining: Strip mining w/draglines in	Pre-Mining	54,
	Grant County	'36-'43	'30's and early '40's followed by	Topography: Rolling terrain,	99, 120, 121, 122
Davenport Mine (Inactive)	Lat 46-29N Lon 101-58W	'48-'72 (84a)	pit mining w/dozers and scrapers from '48-'72. Underground mining prior to surface operation.	elev 2300 ft. <u>Vegetation:</u> Wheatgrass-Needlegrass.	
Omer: K. Davenport	T134N R90W-S34 Bismarck (USGS 1:250,000)		<u>Reclamation:</u> Highwalls were reduced after '70. A small number of Siberian elm, Russian olive and ponderosa pine were planted. <u>Land Use Objectives:</u> Unknown.	<u>Land Use:</u> Grazing. <u>Current</u>	
			Spoils: Age 5-29, 34-38, 42-43 yrs. Older spoils are in ridge and trough configuration w/verticle relief of 50 ft or greater. Areas mined more recently have shallow pits, some that have been backfilled, w/spoils mounded above highwalls. Spoils are mostly well-drained loams; several flooded areas are present. <u>Reclamation:</u> Of several tree species planted only Siberian elm is growing well. Cover by this species is very low (<1%). <u>Natural Revegetation:</u> The oldest spoils have high ground layer cover (up to 50%) dominated by blue grama and sand droseod on spoil crests and by western wheatgrass on lower spoils. Cottonwoods up to 60 ft tall provide up to 25% cover at base of spoils. Newer spoils are highly weedy and are dominated by summercypress and curly- cup gumweed. Perennial species present on younger spoils include slender wheatgrass, yellow sweetclover, white sweetclover, and western wheatgrass. Ground cover by annual species is reduced on older spoils. Marshy areas are dominated by cattail. <u>Land Use:</u> Grazing; wildlife reported include deer, grouse, pheasant, ptarmigan, and muskrats.		

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 11 (Coal) Ecklund Mine (Inactive)	North Dakota Burleigh County Lat 47-6N Lon 100-41W	'23-'64 (30a)	Mining: Strip mine. Reclamation: None. Land Use Objectives: Unknown.	Pre-Mining Topography: Rolling terrain, elev 2100 ft. Vegetation: Wheatgrass-Needlegrass. Dominated by blue grama, western wheatgrass, green needlegrass, and crested wheatgrass; silver sagebrush, and American wormwood common shrubs. Cultivated land abundant.	54, 99, 120, 121, 122
Owner: W. Ecklund	T142N R79W-S7 McClusky (USGS 1:250,000)			Land Use: Grazing and crop production. Current Spoils: 13-54 yrs. Series of parallel spoil ridges 15-20 ft high. Spoils well-drained loams w/boulders, rocks, sands and decomposing shales. Troughs mesic. Natural Revegetation: Spoils dominated by a fairly uniform cover of crested wheatgrass on uplands and bluegrass, slender wheatgrass and various species of goldenrod; average ground layer cover 60%. Snowberry common in mesic areas. Older spoils w/cottonwoods. Land Use: Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 12 (Coal)	North Dakota	'29-'33	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54,
Garrison Mine (Inactive)	McLean County	(15-20a)	<u>Reclamation</u> : None.	<u>Topography</u> : Flat plains area, elev 1900 ft.	120, 121,
Owner:	Lat 47-40N		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	122, 127
R. Sorenson	Lon 101-26W			<u>Land Use</u> : Unknown.	
	T148N R84W-S7			<u>Current</u>	
	Garrison			<u>Spoils</u> : Age 44-48 yrs.	
	(USGS 15')			<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Waterfowl habitat.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 13 (Coal)	North Dakota McLean County	'54-'64 (25a)	Mining: Unknown. Reclamation: None. <u>Land Use Objectives: Unknown.</u>	<u>Pre-Mining</u> Topography: Flat plains area, elev 1900 ft. Vegetation: Wheatgrass-Needlegrass. <u>Land Use: Unknown.</u>	54, 120, 121, 122, 127
Garrison Lignite Co. (Inactive)	Lat 47-40N Lon 101-26W			<u>Current</u> Spoils: Age 13-23 yrs. Natural Revegetation: Unknown. <u>Land Use: Waterfowl habitat.</u>	
<u>Owner:</u> R. Sorenson	T148N R64W-S7 Garrison (USGS 15')				

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 14 (Coal)	North Dakota Bowman County	'46 - present ('46-'69 100a, '69 - present 300a projected disturbance is 80a/yr.	Mining: Strip mine mined by dragline. Topsoil stockpiled. Reclamation: Bury toxic strata, doze spoils to near level, topsoil, drill seed alfalfa, yellow sweetclover, western wheatgrass, and intermediate wheatgrasses and fertilized. Recla- mation prior to '76 did not include top- soiling or fertilization. Scotch pine seedlings were planted in '74. Acres reclaimed and years reclaimed: '73 (30a) '74 (40a) '76 (30a)	<u>Pre-Mining</u> Topography: Gently rolling terrain, elev 2800 ft. Vegetation: Wheatgrass-Needlegrass. Western wheatgrass and blue grama dominated range and cropland. <u>Land Use:</u> Grazing and crop production. <u>Current</u> Spoils: Age 0-4 yrs. Spoils are loamy material w/low sodium content dosed to near-level terrain. Spoils treated in '76 have loamy topsoil. The water table surfaces at several locations. Reclamation: Spoils seeded in '73 and '74 dominated by alfalfa associated w/western wheatgrass, intermediate wheatgrass, and sumucypress; Scotch pine seedlings present on spoils treated in '74. Spoils seeded in '76 dominated by dense stands of sumucypress and Russianthistle. <u>Land Use:</u> Hay production.	29, 54, 99, 123, 124

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 15 (Coal)	North Dakota	'45 - present	Mining: Pit operation, dragline used. Average pit depth of 80 ft.	<u>Pre-Mining</u>	28, 34, 79, 120, 121, 122, 123, 124, 125
Glenharold Pit (Operating)	Oliver County Mercer County	(450a inactive, 1450a active, reclamation in progress in both)	Reclamation: Spoils graded to a slope of 20% grade or less. Planned seeding rates of 180 lb. per acre, fertilizer 150 lb. per acre. Seeding to start in '72.	Topography: Hilly terrain, elev 2000 ft. Vegetation: Wheatgrass-Needlegrass. <u>Land Use:</u> Grazing.	
Operator: Consolidation Coal Co.	Lat 47-15N Lon 101-23W T144N R85W-S13 T144N R84W-S19, 20, 28, 29, 30, 31, 32 T143N R84W-S5, 6		<u>Land Use Objectives:</u> Grazing, pasture and agriculture.	<u>Current</u> Spoils: Age 0-32 yrs. Toxic levels of sodium in overburden, loamy substrate. Steeper spoil slopes gully eroded. Reclamation: Spoils graded to gentle slopes, disked, and seeded to native grasses (80a). Also, test planting of shrubs and trees, including Russian olive, caragana, and Arkansas rose with about 90% success rate. Natural Revegetation: Spoils w/75-100% cover by summercypress. <u>Land Use:</u> Mining.	
	Stanton (USGS 7.5')				

Table 3. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 16 (Coal) Havelock Mine (Inactive)	North Dakota Hettinger County Lat 46-30N Lon 102-44W	'46-'49 (26a)	Mining: Contour/pit mining w/shovels and dozers. Reclamation: None.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 2550 ft. Vegetation: Wheatgrass - Needlegrass. Rangeland dominated blue grama and western wheatgrass associated w/green needlegrass and fringed sage. Mesic areas w/smooth brome.	54, 99, 120, 121, 122
Owner: S. Rafferty (estate)	T135N R96W-S28 Dickinson (USGS 1:250,000)		<u>Land Use Objectives:</u> Unknown.	<u>Land Use:</u> Grazing. <u>Current</u> Spoils: 28-30 yrs. Pit "U" shaped approx 25 ft deep; partially flooded. Spoils well-drained sandy clay loams placed above unreduced highwall in undulating mounds. Gully erosion on steeper spoils; highwall slumping. Natural Revegetation: Ground cover variable. Ground layer on dry spoils dominated by western wheatgrass and green needlegrass; moister areas dominated by smooth brome, slender wheatgrass, and yellow sweetclover. Eroded or shaley spoils or spoils w/coal dominated by curlycup gumweed and heath aster. Foxtail barley dominant in pit. Wet areas dominated by cattail, bulrush, and common reed. Cottonwood and Russian olive trees present at low densities.	
				<u>Land Use:</u> Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres(s) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
R# 17 (Coal)	North Dakota Divide County	'35-'39 (<u><305a</u>)	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54, 120, 121, 122
Holte Mine (Inactive)	Lat 48-52N Lon 102-57W		<u>Reclamation</u> : None. <u>Land Use Objectives</u> : Unknown.	<u>Topography</u> : Rolling terrain, elev. 2000 ft.	
Owner: Beukel-Moonan Inc.	T162N R95W-S12 Columbus BM (USGS 7.5')			<u>Vegetation</u> : Wheatgrass-Bluestem- Needlegrass.	
				<u>Land Use</u> : Unknown.	
				<u>Current</u>	
				<u>Spoils</u> : Age 38-42 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 18 (Coal)	North Dakota	'66 - present	<u>Mining</u> : Doser-scraper operation.	<u>Pre-Mining</u>	54, 76, 121, 123, 124
Husky (Dickinson) (Operating)	Stark County	>100a	<u>Reclamation</u> : Dose to rolling terrain, topsoil, and drill seed w/crested	<u>Topography</u> : Hilly terrain, elev 2500 ft.	
Operator: Husky Industries Inc.	Lat 46-50N Lon 102-42W	35a active 55a reclaimed, reclamation in progress on remainder)	wheatgrass, slender wheatgrass, smooth brome, and alfalfa; yellow sweetclover and rye or oats are seeded as a nurse crop. Reclamation first conducted in '67.	<u>Vegetation</u> : Wheatgrass-Needlegrass blue grama/western wheatgrass dominated prairie.	
	T139N R93W-S7,8, 16,17			<u>Land Use</u> : Grazing, forest, agriculture.	
	Lehigh (USGS 7.5')		<u>Land Use Objectives</u> : Grazing and crop production.		
				<u>Current</u>	
				<u>Spoils</u> : Age 0-11 yrs. Spoils well-drained sandy loams w/rolling topography; slopes to 23°.	
				<u>Reclamation</u> : Variable ground layer cover, averaging 25-35%, dominated by western wheatgrass, yellow sweetclover, and alfalfa.	
				<u>Land Use</u> : Unknown; waterfowl and pheasants noted.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 19 (Coal)	North Dakota	'50-'54 (15a)	Mining: Pit mine in side of hill operated by dozers.	<u>Pre-Mining</u>	54, 99, 120, 121, 136
Ihle Coal Mine (Inactive)	Adams County		Reclamation: None.	<u>Topography:</u> Rolling terrain, elev 2700 ft.	
Lat 45-58N Lon 102-25W			<u>Land Use Objectives:</u> Unknown.	<u>Vegetation:</u> Wheatgrass-Needlegrass. Western wheatgrass and blue grama dominated prairie.	
Owner: A. Ihle	T129N R94W-56, 7			<u>Land Use:</u> Grazing.	
	Dickinson			<u>Current</u>	
	(USGS 1:250,000)			<u>Spoils:</u> Age 23-27 yrs. Pit U-shaped w/well-drained loamy spoils placed in undulating piles on lower highwall. Spoil slopes gully eroded and highwall is sloughing. Pit has sites w/shallow water.	
				<u>Natural Revegetation:</u> Ground cover is varied. Uneroded loams have uniform cover by western wheatgrass (25% cover), eroded loams or shaley areas are dominated by a sparse cover of curlycup gumweed, and moist areas of the pit are dominated by foxtail barley.	
				<u>Land Use:</u> Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
HD 20 (Coal)	North Dakota	'29 - present	Mining: Pit operation, dragline used.	Pre-Mining	28, 54,
Indian Head (Operating)	Mercer County	(133a inactive, 1150a active, reclamation in progress on both)	Average pit depth 45 ft, maximum depth 65 ft.	Topography: Hilly terrain, elev 2000 ft.	79, 120, 121, 122, 123, 124, 125
Operator: North American Coal Corporation	Lat 47-16N Lon 101-53W		Reclamation: Level to original slope and convert 123a to grassland to control erosion; remaining areas will be plowed and seeded for agriculture.	Vegetation: Wheatgrass-Needlegrass. Land Use: Agriculture.	
	T144N R86W-S18,19, 28,30,31,32,33 T143N R86W-S6 T144N R89W-S24, 25,36 T143N R89W-S1		Land Use Objectives: Agriculture, pasture, and grazing.	Current	
	Zap (USGS 7.5')			Spoils: Age 0-48 yrs. Fine-textured clay spoils have toxic levels of sodium.	
				Reclamation: Spoils graded in some areas, and successful seeding of native grasses and grain crops achieved on shallow nontoxic spoils or on topsoiled surfaces. Little success has been achieved in rehabilitating raw spoils without extensive treatment due to high sodium levels.	
				Land Use: Mining, hydrology and reclamation experimental site.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WD 21 (Coal)	North Dakota	'35-'36	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54,
Jensen Mine	Mountrail County	(80a)	<u>Reclamation</u> : None.	Topography: Rolling terrain,	120,
(Inactive)	Lat 40-11N		<u>Land Use Objectives</u> : Unknown.	elev 2200 ft.	121,
<u>Owner</u> :	Lon 102-10W			<u>Vegetation</u> : Wheatgrass-Needlegrass.	122,
A. Jensen	T154M R89N-87			<u>Land Use</u> : Unknown.	132
	Williamson			<u>Current</u>	
	(USGS 1:250,000)			<u>Spoils</u> : Age 41-42 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 21 (Coal)	North Dakota Divide County	'38-'41 (145a)	<u>Mining</u> : Unknown. <u>Reclamation</u> : None.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 2000 ft. Vegetation: Wheatgrass-Bluestem- Needlegrass. <u>Land Use</u> : Unknown. <u>Current</u>	54, 120, 121, 122
Roostak Mine (Inactive)	Lat 48-53N Lon 102-56W		<u>Land Use Objectives</u> : Unknown.		
Omaha Rauko, -Homan Inc.	T16.2N 89.5W-83			<u>Spoils</u> : Age 16-39 yrs. <u>Natural Vegetation</u> : Unknown. <u>Land Use</u> : Unknown.	
	Atmosol (UMS 7.5')				

Table 3. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 21 (Coal)	North Dakota Mercer County	*15-68 (25-10a)	<u>Mining</u> : Unknown. <u>Reclamation</u> : None. <u>Land Use Objectives</u> : Unknown.	<u>Pre-Mining</u> <u>Topography</u> : Hilly terrain, elev 2000 ft. <u>Vegetation</u> : Wheatgrass-Budleygrass. <u>Land Use</u> : Unknown. <u>Current</u> <u>Soils</u> : Age 9-43 yrs. <u>Natural Vegetation</u> : Unknown. <u>Land Use</u> : Unknown.	34, 120, 121, 122
Erosion Mine (Inactive)	Lat 47-28N Lon 101-57W				
Quartz S. Erosion	T146N R00E-S30 Beulah 98 (USGS 7.5')				

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 24 (Coal)	North Dakota	'33-'38, '44,	Mining: Contour mining w/single	Pre-Mining	54,
Landaker Mine	Mountrail County	'47-'49, '62	cuts in 3 separate locations.	Topography: Rolling terrain,	99,
(Inactive)	Lat 48-48	(approx 30a)	Early mining by horses and	elev 2200 ft.	120,
Owner:	Lon 102-13W		scrappers; mining in '62 by		121,
J. Meyers			dozers. Spoils pushed down-		122
(estate)	T153N R90W-S21		hill from cuts.	Vegetation: Wheatgrass-Needlegrass.	
	Williston		Reclamation: None.	Blue grama prairie w/western	
	(USGS 1:250,000)		Land Use Objectives: Unknown.	wheatgrass and prairie sandreed on	
				uplands. Mesic areas dominated by	
				slender wheatgrass, Canada bluegrass,	
				smooth brome, and snowberry.	
				Land Use: Grazing.	
				Current	
				Spoils: Age 15, 28-30, 13, and	
				39-44 yrs. Spoils ranging from coal	
				to loam pushed downhill from coal	
				rounded higher than bench. Spoil slopes	
				10-30° and well drained. Some areas of	
				bench w/springs or flooded sites.	
				Natural Revegetation: Ground layer well	
				developed (average cover 60%). Dry area	
				colonized by blue grama, crested	
				wheatgrass, and western wheatgrass. More	
				mesic areas dominated by slender wheatgrass.	
				smooth brome, and Canada bluegrass. Snowberry	
				provided up to 10% cover on loamy slopes	
				and a few cottonwoods and Russian olive were	
				present in moist areas. Eroded highwalls	
				and spoils composed of coal are barren.	
				Land Use: Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 25 (Coal)	North Dakota Ward County	'26-'39 '49-'66 (60a)	<u>Mining</u> : Unknown. <u>Reclamation</u> : None. <u>Land Use Objectives</u> : Unknown.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 1900 ft. Vegetation: Wheatgrass-Bluestem- Needlegrass. <u>Land Use</u> : Unknown. <u>Current</u>	54, 120, 121, 122
Miller Mine (Inactive)	Lat 47-59N Lon 101-06W				
Owner: Consolidation Coal Co.	T152N R82W-S11 Benedict (USGS 15')			<u>Spoils</u> : Age 11-36, 38-51 yrs. <u>Natural Revegetation</u> : Unknown. <u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 26 (Coal)	North Dakota	'50-'66	Mining: Shallow (30 ft) pit mined by shovel and dozers.	<u>Pre-Mining</u>	54, 99, 120, 121, 122, 133
New England (Inactive)	Hettinger County	(approx 20a)	Reclamation: None.	Topography: Rolling terrain, elev 2550 ft.	
Owner: E. Schorsch	Lat 46-32N Lon 102-44W T135N R96W-S27 Dickinson (USGS 1:250,000)		Land Use Objectives: Unknown.	Vegetation: Wheatgrass-Needlegrass. Blue grama/Western wheatgrass prairie and cultivated fields. <u>Land Use</u> : Grazing and crop production.	
				<u>Current</u> Spoils: Age 11-27 yrs. Spoils undulating mounds in and above pit. Spoils in pit are primarily coal and shales; those above pit are primarily sandy clay loams. Spoils w/gully erosion and highwalls sloughing; portion of pit flooded. Natural Revegetation: Ground layer cover variable (0-80%) depending on substrate. Coal and shales barren. Loamy substrates dominated by crested wheatgrass, yellow sweetclover, fringed sage, curlycup quaweed and, in more mesic sites, by slender wheatgrass and smooth brome. Trees and shrubs scarce. Willows common w/cattail and sedges in wet sites. <u>Land Use</u> : Idle; deer tracks noted.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 27 (Coal)	North Dakota	'30 - present	<u>Mining</u> : Pit operation, dragline used.	<u>Pre-Mining</u>	28, 54, 120, 121, 122, 123, 124, 125
Noonan (Larson) (Operating)	Burke County	(617a total disturbed, 368a reclamation in progress)	<u>Reclamation</u> : Recontour to original configuration. From '63 to '69, approx 35,000 trees and shrubs were planted, and grass-legume mixture aerially seeded w/good results.	Topography: Rolling terrain, elev 2000 ft. Vegetation: Wheatgrass-Bluestem- Needlegrass. <u>Land Use</u> : Grazing and agriculture.	
Operator: Baukol Noonan Inc.	T162N R94W-S3, 4, 5, 6, 9, 10, 11, 14, 15, 16		<u>Land Use Objectives</u> : Wildlife habitat, pasture, and agriculture.	<u>Current</u>	
	Columbus SE (USGS 7.5')			Spoils: Age 0-47 yrs. Spoils generally rolling w/sandy, alkaline substrate throughout northern area. Ground rises to the south with improved soil characteristics. Vacated pits w/water present. <u>Reclamation</u> : Unknown. <u>Land Use</u> : Mining, agriculture and pasture, wildlife habitat.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 28 (Coal)	North Dakota	'57-'72	Mining: Contour mine in side of hill w/spoils cast down slope. Originally mined w/horses and scrapers; later mined w/shovel and cats.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 2000 ft.	54, 91, 120, 121, 122, 135
Olin Mine (Inactive)	Lat 47-6N Lon 101-20W	(approx 16a)	Reclamation: In '72 area broadcast seeded w/yellow sweetclover, timothy, smooth brome.	<u>Vegetation:</u> Wheatgrass-Needlegrass. Prairie dominated by blue grama w/silver sage and fringed sage.	
Owner: H. Bornemann	T142N R84W-S8		<u>Land Use Objectives:</u> Grazing.	<u>Land Use:</u> Grazing.	
	Center (USGS 7.5')			<u>Current</u> Spoils: 5-20 yrs. Spoils in low mounds built up above level of bench. Well-drained sandy loams and coal; standing water in portions of cut. Reclamation: Very low survival of seeded species; some yellow sweet- clover present in moist areas. <u>Natural Revegetation:</u> Spoils dominated by weedy species such as Russian thistle, foxtail barley and curlycup gumweed. Wet areas dominated by cattail and bulrush. Average ground layer cover was less than 5%.	
				<u>Land Use:</u> Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 29 (Coal)	North Dakota	'23-'29 and	Mining: Small contour mine w/overburden removed by horses and scrapers in earlier operations; later operation was dozer-scraper.	Pre-Mining	54, 99, 120, 121, 122
Parshall Mine (Inactive)	Mountrail County	'39 (approx 15-20a)		Topography: Rolling terrain, elev 2000 ft.	
Owner: W. Williamson	Lat 47-53N Lon 102-4W		Reclamation: None.	Vegetation: Wheatgrass-Needlegrass. Blue grama dominated prairie w/abundant fringed sage. Mesic areas w/smooth brome, slender wheatgrass, and snowberry. Wet areas dominated by cordgrass, phragmites, bulrush, or cattail.	
	T151N R09W-S6		Land Use Objectives: Unknown.		
	Parshall SE (USGS 7.5')				
				Land Use: Grazing.	
				Current	
				Spoils: Age 3" and 47-53 yrs. Spoils in several low mounds placed downslope from cut. Primarily well-drained & composed shales w/20-30° slopes. Cut flooded.	
				Natural Revegetation: Shales almost entirely devoid of vegetation. On loamy substrates scattered snowberry dominates the shrub stratum and foxtail barley, Russian thistle, crested wheat, smooth brome, and common sunflower provided up to 25% cover. Periphery of flooded areas w/cattail and bulrush.	
				Land Use: Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 30 (Coal)	North Dakota	'46-'54	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54,
Pederson Mine	McKenzie County	(10-15a)	<u>Reclamation</u> : None.	Topography: Rolling terrain,	120,
(Inactive)	Lat 48-00N		<u>Land Use Objectives</u> : Unknown.	elev 2000 ft.	121,
Owner:	Lon 103-12W			<u>Vegetation</u> : Wheatgrass-Needlegrass.	122,
O. Pederson	T152N R98W-S10,11			<u>Land Use</u> : Unknown.	134
	Williston			<u>Current</u>	
	(USGS 1:250,000)			<u>Spoils</u> : Age 23-31 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 31 (Coal)	North Dakota Stark County	'73-'42 (78a)	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54, 120, 121, 122, 131
Perrinski Mine (Inactive)	Lat 46-51N Lon 102-42W		<u>Reclamation</u> : None.	Topography: Hilly terrain, elev 2400 ft.	
Owner:	T1 19M 895W-87		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
Burlington Northern Railroad	Lehigh (USGS 7.5')			<u>Land Use</u> : Unknown.	
				<u>Current</u>	
				<u>Spills</u> : Age 35-54 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 32 (Coal)	North Dakota Mard County	'29-'59 (125a)	Mining: Underground, pit, and contour mining. Overburden 20 to 40 ft deep removed by dozer-scraper and dragline operation.	Pre-Mining Topography: Rolling terrain w/drainage system-dissected topography, elev 1900 ft.	54, 99, 120, 121, 122, 137
Quality Lignite Mine (Inactive)	Lat 47-56N Lon 101-4W		Reclamation: In '72, site aerial seeded w/smooth brome, alfalfa, yellow sweet clover, crested wheatgrass, and slender wheatgrass.	Vegetation: Wheatgrass-Bluestem- Needlegrass and Northern Floodplain Forest. Uplands dominated by blue grama associated w/western wheatgrass, sidecoats grama, and fringed sage. Cultivated fields prevalent. Arroyos w/bur oak, cottonwood, box elder and green ash.	
Owner: C. Buschler	T152N R62W-S21,24 Benedict (USGS 15')		Land Use Objectives: Grazing.	Land Use: Grazing. Current Spoils: Age 18-48 yrs. Spoils piled in mounds above 20-40 ft pits or cuts. Spoils steeply sloping, (20- 40") well-drained clays or loams. Erosion common on steep spoils and high- walls. Pits or cuts, 20-40 ft deep, occasionally w/flooding areas. Reclamation: Species which were aerial seeded are scarce in most portions of the mine. Occasional sites w/loamy substrates have up to 80% cover. Natural Revegetation: Cottonwoods and, in mesic areas, quaking aspen, green ash and willows occasional in pit. Shrub cover (<1%) represented by locally introduced sage and by sproberry. Ground layer cover on spoils primarily of fringed sage and seeded species; cat tails and bulrush abundant in wet areas of pit.	
				Land Use: Grazing and wildlife; deer, fox, pheasant, and waterfowl reported.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 33 (Coal)	North Dakota	'48-'62 (42a)	Mining: Pit mined by shovel and dozer-scraper operation.		
Regent Mine (Inactive)	Hettinger County				
	Lat 46-24N		Reclamation: None.	<u>Pre-Mining</u>	54, 99, 120, 121, 122
	Lon 102-36W			Topography: Rolling terrain, elev 2550 ft.	
Owner: R. Waggoner	T134N R95W-S9		<u>Land Use Objectives:</u> Unknown.	Vegetation: Wheatgrass-Needlegrass. Western wheatgrass/blue grama dominated range and crops.	
	Regent (USGS 7.5')			Land Use: Grazing and crop production.	
				<u>Current</u>	
				Spoils: Age 15-20 yrs. Shallow 25 ft pit. Spoils drained, steeply undulating mounds of clay, shale, loam, or coal. Gully erosion common. Pit walls sloughing.	
				Natural Revegetation: Cover dispersion highly variable. Clays, shales, and coal barren w/a scattering of curlycup quinceed in spoils and foxtail barley in pit. Loamy spoils w/crested wheatgrass and, in mesic areas, smooth brome and yellow sweetclover. Wet areas w/cattail, sedge, and bulrush.	
				<u>Land Use:</u> Grazing; waterfowl noted.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 34 (Coal)	North Dakota	'29-'64	Mining: Unknown.	<u>Pre-Mining</u>	54,
Richter Mine (Inactive)	Morton County	(167a)	<u>Reclamation</u> : None.	Topography: Rolling terrain, elev 2100 ft.	120, 121, 122
Owner: J. Richter	Lat 46-51N Lon 101-44W		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
	T139N R68W-S13 T140N R65W-S19			<u>Land Use</u> : Unknown.	
	Dengate (USGS 7.5')			<u>Current</u>	
				<u>Spoils</u> : Age 13-48 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 15 (Coal)	North Dakota	'34-'44	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54,
Schorech Mine (Inactive)	Hettinger County	(18a)	<u>Reclamation</u> : None.	Topography: Rolling terrain, elev 2500 ft.	120, 121, 122
<u>Owner</u> :	Lat 46-29N		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
E. Schorech	Lon 102-44W			<u>Land Use</u> : Unknown.	
	T135W R96W-S27			<u>Current</u>	
	Dickinson			<u>Spoils</u> : Age 33-43 yrs.	
	(USGS 1:250,000)			<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Areas (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 36 (Coal)	North Dakota Oliver County	Approx '27 (Approx 10a)	Mining: Shallow pit in side of hill mined w/horse-drawn scrapers. Spoils pushed downhill. <u>Reclamation</u> : None. <u>Land Use Objectives</u> : Unknown.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 2000 ft. Vegetation: Wheatgrass-Needlegrass, Blue grama prairie w/sideote grama and western wheatgrass. <u>Land Use</u> : Grazing.	54, 99
Shank Mine (Inactive)	Lat 47-02N Lon 101-16W			<u>Current</u> Spoils: Age 50 yrs. Spoils low mounds pushed downhill from pit. Drained loams w/slopes of 420°. Little active erosion other than on pit walls. Natural Vegetation: Cottonwood and Russian olives have invaded moist areas providing 45% cover; snowberry is a common shrub on slopes. Spoils and pit w/a fairly dense (75% cover) ground cover dominated by blue grama and sideote grama on drained uplands and slender wheatgrass and Canada bluegrass in moist areas.	
Owner: B. Shank	T142N R84E-S36 Center (USGS 7.5)			<u>Land Use</u> : Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 37 (Coal)	North Dakota McFadden County	'34-'54 (16a)	Mining: Shallow pit mine. Reclamation: None. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Rolling terrain w/some badlands erosion, elev 2100 ft. Vegetation: Wheatgrass-needlegrass. Western wheatgrass/blue grass range. <u>Land Use:</u> Grazing.	94, 99, 120, 121, 122, 124
Shalley Mine (Inactive)	Lat 47-18N Lon 103-13W			<u>Current</u> Spoils: Age 23-43 yrs. Spoils low mounds of coal, clay, or shale, surrounding a shallow excavation. Variable drainage; some water in pit. Natural Reclamation: Amount of vegetation variable depending on substrate. Ground cover 5% dominated by <i>Poa annua</i> w/a little invasion by western wheatgrass. Shrub stratum composed of a scattering of rabbit- brush (cover 5%). <u>Land Use:</u> Grazing.	
Onger, B. Shalley	Watford City (00608 1,250,000)				

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 38 (Coal)	North Dakota	'36-'44	Mining: Unknown.	Pre-Mining	54,
S & L Mine	Hountrail County	'49-'52, '55 (20a)	Reclamation: None.	Topography: Rolling terrain, elev 2000 ft.	120, 121, 122,
(Sirra Mine - pre 1949)	Lat 47-59N		Land Use Objectives: Unknown.	Vegetation: Wheatgrass-Needlegrass.	132
(Inactive)	Lon 102-27W			Land Use: Unknown.	
Owner:	T152N R92W-S16			Current	
G. Stringer	Watford City			Spoils: Age 22, 25-26, 33-41 yrs.	
	(USGS 1:250,000)			Natural Revegetation: Unknown.	
				Land Use: Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 39 (Coal) Shoghelm's Mine (Inactive) Owner: A. Johnson	North Dakota McKenzie County Lat 48-0N Lon 103-12W T152N R98W-S23,24 Watford City (USGS 1:250,000)	'39-'59 (approx 20a)	Mining: Dozer-scraper contour mining w/spoils cast downslope. Reclamation: None. Land Use Objectives: Unknown.	Pre-Mining Topography: Rolling terrain, elev 2000 ft. Vegetation: Wheatgrass-Needlegrass. Range dominated by blue grama and western wheatgrass; moister areas w/Kentucky bluegrass. Land Use: Grazing. Current	54, 99, 120, 121, 122, 134
Spoils: Age 28-48 yrs. Several low mounds cast downhill from cut. Spoils primarily clays, shales, and a large amount of coal. Erosion has reduced highwall (70%) and has deposited a fan of clay in the range below mine. Lower portions of bench flooded. Natural Revegetation: A large variety of perennial vegetation present; amount of cover variable depending on spoil material. Coal spoils had low cover. Drained spoils w/up to 50% cover by western wheatgrass and blue grama; wet areas dominated by cattail, sedge, bulrush, and foxtail barley. Shrub cover (<20%) was dominated by rabbit brush, silver sagebrush, and in wet areas willow. Black willow and cottonwood were present in trees (<1% cover). Land Use: Grazing.					

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 40 (Coal) Spitzer Mine (Inactive)	North Dakota Mountrail County	'25-'27 (30a)	Mining: Unknown. Reclamation: None.	Pre-Mining Topography: Hilly terrain, elev 2000 ft.	54, 120, 121, 122, 132
Owner: A. Spitzer	Lat 47-51N Lon 102-15W T151W R90W-S31 New Town SE (USGS 7.5')		Land Use Objectives: Unknown.	Vegetation: Northern Floodplain Forest and Wheatgrass-Needlegrass. <u>Land Use:</u> Unknown. <u>Current</u>	
				<u>Spoils:</u> Age 50-52 yrs. <u>Natural Revegetation:</u> Unknown. <u>Land Use:</u> Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 41 (Coal)	North Dakota	'26, '29, '30	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54,
Sprecher Mine (Operating)	Grant County	'55 - present (18a)	<u>Reclamation</u> : Unknown.	<u>Topography</u> : Hilly terrain, elev 2300 ft.	120, 121, 122
Operator: Sprecher Coal Mine Co.	Lat 46-29N Lon 101-54W T135W R89W-S29 Bismarck (USGS 1:250,000)		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass. <u>Land Use</u> : Unknown. <u>Current</u>	
				<u>Spoils</u> : Age 0-22, 47-48, 51 yrs. <u>Reclamation</u> : Unknown. <u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
HD 42 (Coal)	North Dakota Williams County	'20-'70 (approx 10a)	<u>Mining</u> : Doser-scraper contour mine.	<u>Pre-Mining</u>	54, 99, 120, 121, 122, 138
Square Deal (Inactive)	Lat 48-9N Lon 103-32W		<u>Reclamation</u> : None.	Topography: Hilly terrain, elev 2000 ft.	
<u>Owner</u> : C. Olson	T154H R100W-S19 Williston East (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass. Hillsides dominated by blue grama, sideoats grama, associated w/little bluestem, silver sagebrush, and pricklypear.	
				<u>Land Use</u> : Grazing.	
				<u>Current</u>	
				<u>Spoils</u> : Age 7-57 yrs (older materials most likely covered by the newer). Spoil clays cast downslope from cut and forming flat areas w/variable drainage. Highway approx 35°.	
				<u>Natural Revegetation</u> : Site poorly revegetated; ground cover of <i>Cl</i> composed primarily of <i>Rusianthistle</i> and small patches of western wheatgrass. Low densities of rabbitbrush and cottonwood populate shrub strata and canopy, respectively.	
				<u>Land Use</u> : Idle.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
HD 43 (Coal)	North Dakota	'55-'57	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54, 120,
Stalter Mine (Inactive)	Hettinger County	(12a)	<u>Reclamation</u> : None.	<u>Topography</u> : Hilly terrain, elev 2550 ft.	121, 122, 133
<u>Owner</u> :	Lat 46-14N		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
H. Watson	Lon 102-20W			<u>Land Use</u> : Unknown.	
	T132N R93W-S28			<u>Current</u>	
	Dickinson			<u>Spoils</u> : Age 20-22 yrs.	
	(USGS 1:250,000)			<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions		Information Sources
				Pre-Mining	Current	
ND 44 (Coal)	North Dakota Mountrail County	'26-'29-'43 (approx 30a)	Mining: Combined pit and contour mine. Mining by dozers and scrapers.	Topography: Hilly terrain, elev 2000 ft.		54, 99, 120, 121, 122
Superior Mine (Inactive)	Lat 47-58N Lon 102-24W		Reclamation: None.	Vegetation: Wheatgrass-Needlegrass. Uplands w/blue grama associated w/western wheatgrass, green needlegrass and on hillsides, little bluestem and sideoats grama. Mesic areas colonized by snowberry and buffaloberry. Cordgrass common in wet areas.		
Owner: D. Erickson	T152N R92W-S13,16 Watford City (USGS 1:250,000)		Land Use Objectives: Unknown.			
				Land Use: Grazing.		
				Current		
				Spoils: Age 34-41 and 43 yrs. Spoils (coal, shale, and loams) placed above lower highwall of cut. Slopes varied from vertical highwalls to level spoil areas. Portions of pit flooded.		
				Natural Revegetation: Ground layer cover varied (0-50%) depending on substrate. Loamy materials w/highest cover dominated by western wheatgrass and green needlegrass; shale or coal substrates dominated by summercypress, Russianthistle, and green needlegrass. Slender wheatgrass, foxtail barley, and sweetclover common in moist areas.		
				Land Use: Grazing.		

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 45 (Coal)	North Dakota Burke County	'33-'39 (650a)	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54, 120, 121, 122, 129
Tveter Bros. (Inactive)	Lat 48-51N Lon 102-45W		<u>Reclamation</u> : None.	Topography: Rolling terrain, elev 2000 ft.	
<u>Owner</u> : J. Tveter	T162N R9M-S20 Columbus SE (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Bluestem- Needlegrass. <u>Land Use</u> : Unknown.	
				<u>Current</u>	
				<u>Spoils</u> : Age 38-44 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 46 (Coal)	North Dakota	'29-'35	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54,
Underwood (Reclaimed)	McLean County	'48-'72 (70a)	<u>Reclamation</u> : In progress, plan unknown.	<u>Topography</u> : Flat plains area, elev 2000 ft.	120, 121, 124, 128
Owner: D. Miller	Lat 47-28N Lon 101-07W T146N R62W-S23		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
	Washburn NE (USGS 7.5')			<u>Land Use</u> : Unknown.	
				<u>Current</u>	
				<u>Spoils</u> : Age 5-29, 42-48 yrs.	
				<u>Reclamation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 47 (Coal)	North Dakota	'27 - present	<u>Mining:</u> Pit operation, dragline used.	<u>Pre-Mining</u>	28,
Velva	Ward County	(as of '74; estimated 1370a	<u>Reclamation:</u> All peaks and ridges were struck to a minimum width of 35 ft at the top prior to '72; after '72 spoils reshaped to near original contour and spoils drill-seeded w/grasses and legumes. As of '71, 36a seeded and 30.6a prepared for seeding.	Topography: Rolling terrain, elev 1750 ft.	29, 54, 76, 79,
Operator:	Lat 47-56N	including 320a		<u>Vegetation:</u> Wheatgrass-Bluestem- Needlegrass.	120, 123, 124
Consolidation	Lon 101-00W	active spoils. Approx 30a disturbed		<u>Land Use:</u> Agriculture.	
Coal Co.	T152N R01W-S28, 34,35	annually)		<u>Current</u>	
	T151N R01W-S1,2		<u>Land Use Objectives:</u> unknown.	<u>Spoils:</u> Age 0-50 yrs. Older spoils w/ridge and trough topography. Some peaks flattened to a minimum of 35 ft. Some troughs water-filled. Recent spoils dozed to rolling terrain. Primarily well- drained loams.	
	Benedict (USGS 15')			<u>Reclamation:</u> Reclaimed spoils treated as in plan; average ground layer cover 50%; yellow sweetclover and wheatgrasses dominant.	
				<u>Natural Revegetation:</u> Average ground layer cover 30%; wheatgrasses and field bindweed dominant.	
				<u>Land Use:</u> Idle.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
RD 48 (Coal)	North Dakota	'53-'70 (50a)	Mining: Contour mine. Draglines and shovels used to expose coal in walls of arroyo. Spoils placed above and below cuts.	<u>Pre-Mining</u>	54, 99, 120, 121, 122, 137
Vix Mine (Inactive)	Lat 47-59N Lon 101-10W			<u>Topography:</u> Rolling terrain and arroyos, elev 1800 ft.	
Owner: C. Buechler	T152N R82W-S25 Benedict (USGS 15')		<u>Reclamation:</u> Mine aerial seeded w/smooth brome, crested wheat, slender wheatgrass, and yellow sweetclover in '72. A few Russian olives planted.	<u>Vegetation:</u> Wheatgrass-Bluestem-Needlegrass and Northern Floodplain Forest. Uplands are blue grama/western wheatgrass dominated prairie w/abundant fringed sage. Stream valleys dominated by green ash, quaking aspen, cottonwood, bur oak and boxelder.	
			<u>Land Use Objectives:</u> Grazing.	<u>Land Use:</u> Grazing.	
				<u>Current</u>	
				<u>Spoils:</u> 7-24 yrs.	
				Spoils in ridges to either side of cut in hillside. Shales, clays and loams well drained w/gully erosion and w/slopes frequently >35°. Portions of pit flooded.	
				<u>Reclamation:</u> Species seeded in '72 of little importance; seeding apparently unsuccessful. Russian olives have survived and have shown good growth.	
				<u>Natural Revegetation:</u> Tree species, cottonwood and quaking aspen associated w/bur oak, green ash, and Russian olive provided up to 75% cover on older spoils; overall cover 5%. A locally introduced sage, American wormwood provided up to 50% cover on clay slopes. Weedy species such as Russian thistle, sunnycypress, and foxtail barley were predominant in ground layer; slender wheatgrass and cocklebur present in moist areas. Average ground layer cover variable, 0-30%.	
				<u>Land Use:</u> Grazing.	

Table 5. (continued)

Mine	Location	Dates and Areas (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 49 (Coal)	North Dakota	'23-'85	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54,
Watson Mine (Inactive)	Hettinger County	(15a)	<u>Reclamation</u> : None.	Topography: Hilly terrain, elev 2550 ft.	120, 121, 122, 133
Owner: H. Watson	Lat 46-14N Lon 102-20W		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
	T132N R93W-E28			<u>Land Use</u> : Unknown.	
	Dickinson			<u>Current</u>	
	(USGS 1:250,000)			<u>Spoils</u> : Age 22-54 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Areas (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 50 (Coal)	North Dakota Burleigh County	'30-'45 (250a)	<u>Mining</u> : Unknown.	<u>Pre-Mining</u>	54, 120, 121, 122, 130
Wilton Mine (Inactive)	Lat 47-10N Lon 100-40W		<u>Reclamation</u> : None. <u>Land Use Objectives</u> : Unknown.	<u>Topography</u> : Rolling terrain, elev 2100 ft. <u>Vegetation</u> : Wheatgrass-Needlegrass. <u>Land Use</u> : Unknown.	
<u>Owner</u> : A. Kovich	T143N R79W-S31 T142N R79W-S6, 7, 8 McCluskey (USGS 1:250,000)			<u>Current</u> <u>Soils</u> : Age 31-47 yrs. <u>Natural Vegetation</u> : Unknown. <u>Land Use</u> : Agriculture.	

Table 5. (continued)

Mine	Location	Dates and Acreage of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 51 (Granite) Church 1 (Inactive)	North Dakota Billings and Slope Counties	'54-'66 (approx 300)	Mining: Shallow pit mined by drag- scraper operation. Lignite burned on site and ash shipped. Reclamation: None.	Pre-Mining Topography: Rolling terrain, elev 3000 ft. Vegetation: Wheatgrass-Woodingrass. Rangeland dominated by blue grama and western wheatgrass associated w/silver sagebrush and fringed sagebrush.	54, 65, 99, 123
Owner: L. Price	Lat 46-39N Lon 103-16W T117N R100W-327,28, 33,34 T130N R100W-35,6		Land Use Objectives: Unknown.	Land Use: Grazing. Current Spoils: Age 11-23 yrs. Several shallow (up to 30 ft) silted in pits. Spoils well-drained sandy clays and lignite ranging from flat to 30°. Daily erosion common on spoils. Portions of pit flooded.	
	Rocky Ridge (USGS 15')			Natural Vegetation: Site very barren (cover 1%). Prairie sandreed occasional on sandy spoils; curlycup gumweed a common weed. Land Use: Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 52 (Uranium)	North Dakota Stark County	'63-'66 (approx 50a)	Mining: Shallow pit in North Dakota lignite area. Dozer-scraper operation.	<u>Pre-Mining</u>	54, 65, 99
Frank Mine (Inactive)	Lat 46-56N Lon 103-9W		Reclamation: Crested wheatgrass, smooth brome, and yellow sweetclover have been hand-seeded by owner; date unknown.	Topography: Rolling terrain, elev 2800 ft.	
Owner: M. Frank	T14N R9W-S6, 7			Vegetation: Wheatgrass-Needlegrass. Rangeland dominated western wheatgrass and blue grama associated w/fringed sagebrush and silver sagebrush.	
	Belfield (USGS 7.5')		Land Use Objectives: Unknown.	Land Use: Agriculture.	
				<u>Current</u>	
				Spoils: 11-14 yrs. Spoils are well-drained sandy loams in mounds located above pit walls. Large boulders are in isolated piles. Pit walls up to 40 ft, unreduced, and sloughing. Shale areas of pit flooded.	
				Reclamation: Spoils w/ave 75% ground layer cover by seeded species. Crested wheatgrass associated w/smooth brome are dominant on spoil tops and smooth brome associated w/yellow sweetclover dominant on spoil slopes. Pit relatively barren.	
				Natural Revegetation: Wet areas of pit invaded by cattail, bulrush, and foxtail barley, cottonwood and willows. Dry areas invaded by Russian thistle.	
				Land Use: Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 53 (Uranium)	North Dakota	'62-'66	<u>Mining</u> : Shallow pit operation (16 ft).	<u>Pre-Mining</u>	54, 65
Hurick #1	Slope County	(15a)	<u>Reclamation</u> : Unknown.	<u>Topography</u> : Hilly terrain, elev 3000 ft.	
(Inactive)	Lat 46-37N		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
Owner:	Lon 103-16W			<u>Land Use</u> : Unknown.	
J. Hurick	T136N R100W-S5			<u>Current</u>	
	Rocky Ridge			<u>Spoils</u> : Age 11-15 yrs.	
	(USGS 15')			<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 54 (Uranium)	North Dakota	'67-'68	Mining: Shallow pit, dozer-scraper operation. Lignite burned on site and ash shipped.	Pre-Mining	54,
Klym Mine (Inactive)	Billings County	(25a pit, 25a spoils)		Topography: Rolling terrain, elev 2600 ft.	65, 99, 131
Owner: W. Klym	Lat 47-6N Lon 103-13W		Reclamation: Site broadcast seeded w/smooth brome, crested wheatgrass, and tall wheatgrass. A scattering of Russian olive, chokecherry, green ash, blue spruce, and caragana.	Vegetation: Wheatgrass-Needlegrass. Range dominated by blue grama associated w/green needlegrass, western wheatgrass, silver sagebrush and fringed sagebrush.	
	T142N R99W-S26		Land Use Objectives: Wildlife.		
	Rattlesnake Butte (USGS 7.5')			Land Use: Grazing.	
				Current	
				Spoils: Age 9-10 yrs. Pit shallow, 15 ft, spoils undulating contours. Mostly well-drained sands; large boulders dozed into piles. Several flooded areas in pit.	
				Reclamation: Spoils treated as in plan. Seeded species were the dominant components of site vegetation. Ground cover up to 70% dominated by crested wheatgrass in xeric areas and by smooth brome in mesic areas. Planted shrubs, w/the exception of blue spruce, showed high survival rates. Russian olive was growing particularly well.	
				Natural Revegetation: On upland spoils, natural revegetation was insignificant relative to that established by reclamation. Slender wheatgrass and western wheatgrass supplemented seeded species. Moist areas in pit dominated by cattail. Large cottonwoods up to 25 ft tall common.	
				Land Use: Wildlife.	

Table 5. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 55 (Uranium)	North Dakota Stark County	'65-'68 (>20a)	Mining: Two shallow pits, 4a and 10a. Average pit depth 29 ft. Dozer-scraper operation.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 2700 ft.	54, 65
Luptak Mine (Inactive)	Lat 46-58N Lon 103-13W		<u>Reclamation</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
Owner: A. Luptak	T140N R99W-S6 Belfield (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	<u>Land Use</u> : Unknown. <u>Current</u>	
				<u>Spoils</u> : Age 9-12 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 56 (Uranium) Section 2 Mine (Inactive)	North Dakota Billings County Lat 46-41N Lon 103-18W	'63-'68 (10a)	Mining: Shallow pit (13 ft) mined by dozer-scraper. Uranium in lignite. Reclamation: None.	Pre-Mining Topography: Rolling terrain, elev 2900 ft.	54, 65, 99, 131
Owner: W. Schwartz	T137N R100W-S2 Rocky Ridge (USGS 15')		Land Use Objectives: Unknown.	Vegetation: Wheatgrass-Needlegrass. Rangeland blue grama dominated prairie often seeded w/crested wheatgrass. <u>Land Use:</u> Grazing. <u>Current</u> Spoils: 9-14 yrs. Shallow pit w/spoils dozed out of pit in ramp-shaped mounds. Spoils and pit floor primarily sands and decomposed shales. Spoils drained; pit moist w/a few wet areas. Natural Revegetation: Very barren; cover <1%. Small amounts of prairie sandreed on fertile soil washed into pit. <u>Land Use:</u> Grazing.	

Table 5. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ND 57 (Uranium)	North Dakota Billings County	'60-'65 (30+a)	Mining: Shallow pit in lignite deposit mined by dozers and scrapers. Reclamation: Site was hand seeded w/smooth brome, crested wheatgrass, and yellow sweetclover in the late '60's. Land Use Objectives: Grazing.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 2700 ft. Vegetation: Wheatgrass-Needlegrass. Blue grama dominated prairie seeded w/smooth brome, crested wheatgrass, and alfalfa. <u>Land Use:</u> Grazing.	54, 65, 99
Talkington Mine (Inactive)	Lat 46-58N Lon 103-14W				
Owner: H. Talkington	T140N R100W-S10 Belfield (USGS 7.5')			<u>Current</u> Spoils: Age 12-17 yrs. Spoils are primarily sand and sandy loam situated in one large relatively flat topped mound. Pits 10-15 ft deep w/shales and lignite on pit floor. Pit has small areas w/standing water. Reclamation: Spoils covered w/dense (75% cover) plant and litter cover by smooth brome, crested wheatgrass; pit is relatively barren. Natural Revegetation: Pit is relatively barren w/low sporadic cover by slender wheatgrass in the ground layer and a low cover by cottonwood and willow in the shrub stratum. <u>Land Use:</u> Grazing.	

TABLE 6

NORTHERN GREAT PLAINS REGION

DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED

FOR COAL AND URANIUM PRIOR TO 1976 IN SOUTH DAKOTA

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions		Information Sources
SD 1 (Coal)	South Dakota DeWey County	'25-'46 (30a) '47-'68 (30a)	Minino: Strip and pit mines mined by dozer-scraper and dragline operations.			54, 99, 139, 140
Firesteel Mine (Inactive)	Lat 45-24N Lon 101-17W		Reclamation: None.		<u>Pre-Mining</u> Topography: Rolling terrain, elev 2300 ft.	
Owner: W. Johnson L. Keller R. Rowland S. Sheer S. Traversle	T17N R23S-S7, 17, 18 McIntosh		Land Use Objectives: Unknown.		Vegetation: Wheatgrass-Needlegrass. Rangeland dominated by western wheat- grass and blue grama associated with silver sagebrush and fringed sagebrush; cropland.	
					Land Use: Grazing and crop production.	

Current

Natural Revegetation: Vegetation is varied according to age and substrate. The ground layer cover on uplands of older spolls is colonized by a uniform cover (commonly up to 70%) of crested wheatgrass associated w/western wheatgrass, green needlegrass, and heath aster; moister areas are dominated by smooth brome, bluegrass, and yellow sweetclover. Silver sagebrush provides up to 40% shrub cover. Russianthistle and summercypress dominate clay, shale, or coal spoils and eroded loamy sites. Cattail and willow dominate marshy areas. Younger spoils have a similar vegetative composition but have a much lower ground layer and shrub layer cover and higher proportion of weedy species such as Russianthistle and summercypress.

Land Use: Grazing.

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 2 (Uranium) Bud-Lucky Bud (Inactive)	South Dakota Fall River County Lat 43-29N Lon 103-59W	'56-'64 (estimated 30a)	Mining: Pit operation; most area- backfilled. Average ore depth 100 ft. Reclamation: None.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 4100 ft. Vegetation: Black Hills Pine Forest. Ponderosa pine savanna w/a ground layer dominated by blue grama and buffalo- grass associated w/Pendler threeseam and sand dropseed.	54, 65, 99
Owner: D. Spencer	T6S R1E-S34, 35 Jewel Cave (USGS 7.5')		Land Use Objectives: Unknown.	<u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age 13-21 yrs. Spoils are large backfilled areas of low undulating mounds; substrates are sands and sandy clays. Pit deep and the entire floor is flooded. Natural Revegetation: Vegetation distribution highly varied; average ground cover 5%. Dominant ground layer species are Russian thistle, sumacypress, curlycup quinceed, bee spiderflower, and tenpetal mentzelia. <u>Land Use:</u> Grazing; wildlife sited include golden eagle, waterfowl, and coyote.	

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 3 (Uranium)	South Dakota	'64	Mining: Shallow pit in lignite deposits. Pit depth 20 ft. Doser-	<u>Pre-Mining</u>	54,
Crazy Group (Inactive)	Harding County	(approx 10a)	scraper operation.	Topography: Hilly terrain, elev 3400 ft.	63
	Lat 45-22N Lon 103-4W		<u>Reclamation</u> : None.	<u>Vegetation</u> : Black Hills Pine Forest.	
<u>Owner</u> :	T10N R9E-S1B		<u>Land Use Objectives</u> : Unknown.	<u>Land Use</u> : National Forest.	
Federal (U.S. Forest Service)	Sheep Mtn. (USGS 7.5')			<u>Current</u>	
				<u>Spoils</u> : Age 13 yrs.	
				<u>Natural Revegetation</u> : Unknown.	
				<u>Land Use</u> : National Forest.	

Table 6. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 4 (Uranium)	South Dakota	'58-'71 (40a)	Mining: Pit operation at depth of 75 ft.	<u>Pre-Mining</u>	54, 55
Darrow Lease (Inactive)	Fall River County Lat 43-28N Lon 103-56W		<u>Reclamation</u> : Unknown.	Topography: Rolling terrain, elev 3800 ft.	
Owner: E. Darrow	T7S R1E-S2 Burdock (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
				<u>Land Use</u> : Unknown.	
				<u>Current</u>	
				<u>Spoils</u> : Age 6-19 yrs.	
				<u>Reclamation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 5 (Uranium)	South Dakota Harding County	'62-'66 (25a)	Mining: Doser-scraper contour mining in lignite deposits. Average ore depth 30 ft. Reclamation: None.	Pre-Mining Topography: Hilly terrain, elev 3100 ft. Vegetation: Wheatgrass-Weedgrass. Range land dominated by western wheatgrass and blue grama associated w/silver sagebrush and, in drainage paths, snowberry.	54, 65, 99, 141
Flat Top Group (Inactive)	Lat 45-50N Lon 103-22W		Land Use Objectives: Unknown.		
Owner: C. Crevier	T22N R6E-S27 Ludlow SE (USGS 7.5')			Current Spoils: Age 11-15 yrs. Spoils well-drained sand or sandy clay cast downhill from cut. Slopes, including unreduced highwall, frequently >20°. 5a lake present. Natural Revegetation: Vegetation sparse; small amounts of rabbitbrush and silver sagebrush present on slopes (cover <1%). Curlycup gumweed and foxtail barley dominate the ground layer (<5% cover); western wheatgrass is occasional on loamy spoil. Land Use: Grazing; site utilized by deer.	

Table 6. (continued)

Mine	Location	Dates and Areas (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 6 (Uranium)	South Dakota	'54-'66	Mining: Shallow pit, ave. 70 ft deep, mined by dozers. Underground mining conducted from adits at base of pit.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 4000 ft.	54, 65, 99
Freeport Mine (Inactive)	Fall River County	(250a)		Vegetation: Black Hills Pine Forest. Ponderosa pine dominates the overstory. Scattered big sage dominates the shrub stratum, and blue grama and buffalo- grass dominate the ground layer.	
Owner: Federal (U.S. Forest Service)	Lot 43-298 Lon 103-57W T6S R1E-54 Jewel Cave (USGS 7.5')		<u>Reclamation:</u> None. <u>Land Use Objectives:</u> Unknown.	<u>Land Use:</u> National Forest.	
				<u>Current</u> Soils: Age 11-23 yrs. Spoils are well-drained sands, sandy clays, and shales w/rocks dug into tall flat-topped mounds. Sides slopes long, steep (65°), and eroded. Pit terraced.	
				Natural Revegetation: Very barren site; a scattered dispersion of depauperate Russianthus.	
				<u>Land Use:</u> National Forest.	

Table 5. (continued)

Mine	Location	Dates and Areas of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MD 7 (Uranium)	South Dakota	'53-'62	Mining: Small contour mine in side of hill.	Topography: Hilly terrain, elev 4100 ft.	54, 65, 99
May and Fay (Inactive)	Fall River County	(approx 10a)	Reclamation: None.	Vegetation: Black Hills Pine Forest. Ponderosa pine overstory w/small scattered, little bluestem, prairie sandreed, and fringed sage in the lower strata.	
Condit G. May	Lat 43-23N Lon 103-40W T7S R3E-S20		Land Use Objectives: Unknown.		
	Edgemont NE (USGS 7.5')			Land Use: Grazing.	
				Current	
				Spoils: Age 15-24 yrs. Two bench cuts w/spoils east downhill. Spoils, bench, and highwall composed of sandstone and sandy materials. Spoils are well drained.	
				Natural Vegetation: Sparse vegetation cover; all strata w/1% cover. Ponderosa pine and cottonwood are present in the tree and shrub strata. Ground layer w/small amounts of yellow sweetclover, little bluestem, Louisiana sagebrush, and Fendler threeseam.	
				Land Use: Grazing.	

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 8 (Uranium)	South Dakota	'52-'67	Mining: Shallow pit, average 30 ft deep in sandstone.	<u>Pre-Mining</u>	54, 65
Holdup No. 5 (Inactive)	Fall River County	(approx 10a)		Topography: Hilly terrain, elev 4100 ft.	
	Lat 43-24N		Reclamation: None.		
	Lon 103-46W		Land Use Objectives: Unknown.	Vegetation: Black Hills Pine Forest.	
Owner:	T7S R1E-S33			Land Use: National Forest.	
Federal	Edgemont NE			<u>Current</u>	
(U.S. Forest Service)	(USGS 7.5')			Spoils: Age 10-25 yrs.	
				Natural Revegetation: Unknown.	
				Land Use: National Forest.	

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 9 (Uranium)	South Dakota Fall River County	'52-'70 (10a)	<u>Mining</u> : Dozer-scraper operation, two shallow pits each 25 ft deep.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 4100 ft.	54, 65
Lion-McKnight (Inactive)	Lat 43-24N Lon 103-41W		<u>Reclamation</u> : Unknown.	<u>Vegetation</u> : Wheatgrass-Needlegrass.	
Owner: Private	T8S R3E-S12 Minnekahta (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	<u>Land Use</u> : Unknown. <u>Current</u>	
				<u>Spoils</u> : Age 7-25 yrs.	
				<u>Reclamation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 6. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 10 (Uranium)	South Dakota Harding County	'55-'56 (15a)	Mining: Contour mine in lignite deposit.	<u>Pre-Mining</u>	54, 65, 99
Pickpocket Mine (Inactive)	Lat 45-50N Lon 103-27W		<u>Reclamation:</u> None.	Topography: Hilly terrain, elev 3300 ft.	
Owner:	T22N R5E-S35, 36		<u>Land Use Objectives:</u> Unknown.	Vegetation: Black Hills Pine Forest. Ponderosa pine overstory w/blue grama and western wheatgrass dominated ground layer.	
Federal (U.S. Forest Service)	Ludlow (USGS 7.5')			<u>Land Use:</u> National Forest, grazing.	
				<u>Current</u>	
				Spoils: Age 21-22 yrs. Spoils, lignite and sandy materials w/large sandstone rocks, placed downhill from cuts in irregular mounds. Spoils well drained; a few moist areas present on floor of cut.	
				Natural Revegetation: Vegetative cover dispersion varied; plant cover 0-30% averaging <10%. Dominant species are curlycup gumweed and rabbitbrush.	
				<u>Land Use:</u> National Forest, grazing.	

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 11 (Uranium)	South Dakota	'60-'65	Mining: Shallow, level, lignite deposit mined by dozers.	Pre-Mining	54,
Relf Group (Inactive)	Harding County	(>10a)	Reclamation: None.	Topography: Hilly terrain, elev 3200 ft.	65, 99
Owner: Federal (U.S. Forest Service)	Lat 45-50N Lon 103-29W T22N R5E-S26,35 Ludlow (USGS 7.5')		Land Use Objectives: Unknown.	Vegetation: Black Hills Pine Forest. Ponderosa pine overstory w/a western wheatgrass and blue grama dominated ground layer.	
				Land Use: National Forest.	
				Current	
				Spoils: Age 12-17 yrs. A large flat area of consolidated sandstone w/a few small mounds of lignite and occasionally a small amount of sandy loam. Puddles are located in depressions of the sand- stone substrate.	
				Natural Revegetation: Revegetation limited to rock cracks or areas w/spoil material. Prevalent species are curlycup gumweed, western wheat- grass, snakeweed and green needlegrass.	
				Land Use: National Forest.	

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 12 (Uranium)	South Dakota Harding County	'60-'64 (2100a)	Mining: Several contour cuts and pits mined by dozer. Ore was located in bedded lignite; average ore depth 60 ft.	Pre-Mining Topography: Hilly terrain, elev 3100-3400 ft.	54, 65, 99
Riley Group (Includes: Bone-Choppy, Dark Jim, Riley, and Susan Becky-Old Badger claims) (Inactive)	Lat 45-51N Lon 103-30W T22N R5E-S22, 23, 26, 27 Ludlow (USGS 7.5')		Reclamation: Water has been impounded to reduce siltation of the natural drainage course below the mine site. <u>Land Use Objectives:</u> Unknown.	Vegetation: Black Hills Pine Forest and Wheatgrass-Needlegrass. Range- land w/scattered ponderosa pine. Ground layer dominated by blue grama and western wheatgrass associated w/fringed sagebrush. <u>Land Use:</u> National Forest.	
Owner: Federal (U.S. Forest Service)				<u>Current</u> Spoils: Age 13-17 yrs. Several cuts in side of hill w/high walls from 20-60 ft. Spoils ranging from sandstone to clay to lignite are situated downhill from cuts and pits. A small lake has been created to reduce siltation of the drainage course below the mined area. Natural Revegetation: Vegetation cover on most of the mined site, particularly on consolidated bed- rock and lignite or clay spoils, is sparse (<5%) and dominated by Russian thistle and summercypress. Ground cover up to 45% is present on isolated sandy or loamy spoils dominated by a variety of sagebrush species, green needlegrass, curlycup quinceed, yellow sweetclover, and western wheatgrass. Wet areas are dominated by foxtail barley. <u>Land Use:</u> National Forest.	

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 13 (Uranium)	South Dakota	'63-'64	Mining: Shallow pit mine; ore depth approx. 40 ft.	Pre-Mining	54,
Rowena Pit	Fall River County	(approx 10a)		Topography: Hilly terrain,	65,
(Inactive)	Lat 43-25N	recent distur-	Reclamation: None.	elev 4000 ft.	99
Owner:	Lon 103-50W	bance by ore	Land Use Objectives: Unknown.	Vegetation: Wheatgrass-Needlegrass.	
Federal	T7S R2E-S25	prospecting.		Rangeland dominated by blue grama	
(U.S. Forest	Edgemont NE			and western wheatgrass.	
Service)	(USGS 7.5')			Land Use: National Forest.	
				Current	
				Spoils: Age 13-14 yrs.	
				Recently redistributed by ore prospecting.	
				Pit located in side of gently sloping	
				hill. Spoils, composed of well-drained	
				sandstone and sands, are mesa shaped.	
				Pit partially flooded.	
				Natural Revegetation: Vegetation sparse;	
				a scattering of ponderosa pine, big	
				sagebrush, and rabbitbrush dominate the	
				shrub stratum (cover <1%) and fringed	
				sagebrush, snakeweed, and Fendler threeawn	
				dominate the ground layer (cover <1%).	
				Recently disturbed area barren.	
				Land Use: National Forest, grazing;	
				wildlife use noted.	

Table 6. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 14 (Uranium)	South Dakota Fall River County	'50's and '60's (approx 10a)	Mining: Several pits and cuts along ravine walls. Reclamation: None. Land Use Objectives: Unknown.	Pre-Mining Topography: Hilley terrair, elev 4100 ft. Vegetation: Black Hills Pine Forest. Ponderosa pine w/small soapweed, fringed sagebrush, little bluestem, prairie sandreed, and buffalograss in the lower strata. Land Use: National Forest.	54, 65, 99
Section 19, 20, and 30 pits (inactive)	Lat 43-25N Lon 103-48W				
Owner: Federal U.S. Forest Service	T7S R3E-S19, 20, 30 Edgemont NE and Minnekahta (USGS 7.5')				
				Current Spoils: Age approx 10-20 yrs. Scattered pits or cuts in ravine walls. Spoils of well-drained sands and sandstone rocks pushed downhill from excavation. Natural Revegetation: Vegetation sparse; average canopy, shrub, and ground layer cover each <1%. Ponderosa pine, densest on spoil piles, dominate the tree and shrub strata. Fringed sage and curlycup gumweed are common on spoil piles. Little bluestem is common on sites w/heavier soils. Land Use: National Forest.	

Table 6. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
SD 15 (Uranium)	South Dakota Harding County	'54-'64 (approx 15a)	Mining: Contour mining by dozers and scrapers. Lignite deposit about 30-40 ft. deep. Reclamation: None. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 3250 ft. Vegetation: Black Hills Pine Forest and Wheatgrass-Needlegrass. Scattered ponderosa pine w/cottonwood, green ash, and silver buffaloberry in washes. Ground layer dominated by western wheatgrass and blue grama. <u>Land Use:</u> National Forest, grazing.	54, 65, 99
Snake Eye and Billy Dale (Inactive)	Lat 45-50N Lon 103-27W				
Owner: Federal (U.S. Forest Service)	T22N R3E-S36 Ludlow (USGS 7.5')				
				<u>Current</u> Spoils: Age 13-23 yrs. Spoil, loam, lignite, sand, sandy clay, and rocks, pushed down hill from cuts; slopes mostly >15°. Gully erosion prevalent on well-drained slopes. Natural Revegetation: Amount of vegetative cover varied. Spoil slopes, w/up to 25% shrub cover, are dominated by silver sage on heavier soils and rabbitbrush on lighter soils. Western wheatgrass, cheatgrass, and yellow sweetclover dominate the ground layer of spoil slopes (up to 30% cover); barren areas are dominated by curlycup gumweed and foxtail barley. <u>Land Use:</u> National Forest, grazing.	

TABLE 7

NORTHERN GREAT PLAINS REGION

DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR COAL, URANIUM, AND PHOSPHATE PRIOR TO 1976 IN WYOMING

Table 7.

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
Belle Ayr Mine (Operating)	Wyoming Campbell County Lat 44-0N Lon 105-25W	'73 - present (300a active pit, 125a temporary re- clamation, 60a permanent reclamation).	Mining: 300a pit, mined w/electric shovels, bucketwheel excavator, dozer and front end loaders. Reclamation: Future plan is to dove spoils to 5:1 or gentler slopes, cover w/8-10 ft of subsoil and 2 ft of topsoil, disk, cultipack, mulch and crimp, fertilize w/N and P and drill w/a mixture of perennials and winter wheat. Seeding mixture to include: western wheatgrass, thickspike wheatgrass, green needlegrass, blue grama, alfalfa, and sainfoin. Seeding mixture is subject to change as the most successful species are determined through experimental species trial plots and evaluations of seedings.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 4450 ft. Vegetation: Wheatgrass-Needlegrass- Shrub Steppe w/big sagebrush, western wheatgrass, Junegrass, and Sandberg bluegrass dominating. <u>Land Use:</u> Grazing and wildlife. <u>Current</u> Spoils: Age 0-4 yrs. Large flat-topped areas w/slopes of 5:1 or less and outer slopes up to 3:1. Some areas topped w/sandy loam, areas have rocky or gravelly substrates. Reclamation: Alfalfa dominates on older (174) topsoil stockpiles which have been seeded with tall wheatgrass, smooth brome, alfalfa, yellow sweetclover, and crested wheatgrass; sumnercypress and tall wheatgrass are also abundant. Cover estimates range from 0-40% averaging approximately 15%. On more recently reclaimed areas sumnercypress dominates, providing up to 75% cover. Several tree species are planted experimentally and provide significant cover.	28, 32, 47, 54, 76, 99, 105, 179
Operator: Amox Coal Co.	T47 & 48N, E71W The Gap SW (USGS 7.5')		<u>Land Use Objectives:</u> Grazing.		

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 2 (coal)	Wyoming	'69-'71 (80a)	Mining: Dozer-scraper operation, some topsoil stockpiled.	Pre-Mining	34,
Big Ditch Pit (Inactive)	Carbon County	(80a reclaimed in '71)	Reclamation: Dozed to reduce highwall, graded, topsoiled and seeded.	Topography: Hilly terrain, elev 7000 ft.	54, 92, 99
Operator: Energy Development Co.	Lat 41-53N Lon 106-37W T22N R62W-S16		Land Use Objectives: Wildlife.	Vegetation: Sagebrush Steppe. Sage, Gardner saltbush and wheatgrasses.	
	Elmo (USGS 7.5')			Land Use: Grazing and wildlife.	
				<u>Current</u>	
				Spoils: Age 6-8 yrs. Large, mesa-like, flat-topped area w/ steep (30°) side slopes, 10a lake present. Spoils xeric, well drained w/ little erosion. Soils compacted, consisting of sandy clay loams.	
				Reclamation: Spoils dozed, topsoiled. Very little vegetation present. essentially barren spoils. Very sparse shrub invasion by sage and snake- weed on NE facing slopes. Ground layer of <i>Eusanthiastle</i> , <i>halocetion</i> and summer- cypress, equally sparse.	
				Land Use: Wildlife; antelope observed.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 3 (Coal)	Wyoming	'44	Mining: Dragline-deer operation.	Pre-Mining	14,
Big Horn Hidden	Sheridan County	(1944 spoils, 7a lake)	Reclamation: None.	Topography: Hilly terrain, elev 4200 ft.	54, 99, 110
Valley, Sec. 1	Lat 44-57N		Land Use Objectives: Unknown.	Vegetation: Sagebrush-Steppe. Dominated by big sage (40% cover). Ground layer composed of bluebunch wheatgrass, slender wheatgrass, and snakeweed. Overgrazed (cover 15%). Shrub on hills.	
Mine	Lon 107-30W			Land Use: Grazing.	
(Inactive)	T15N R35E-S36			Current	
Owner:	T17N R35E-S1			Spoils: Age 33 yrs. 10-40 ft ridge-and-trough topography w/several flooded cuts. Spoils well drained with gully erosion on 20-40° slopes. Spoils composed of scoria, shales, coal, and sandy loam.	
State of Wyoming	Monarch (USGS 7.5')			Natural Vegetation: Spoils sparsely colonized, primarily weedy annuals such as cheatgrass brome, Japanese brome, thistle, wild lettuce, common sunflower, and summer- cypress. Areas w/heavier soils are colonized by slender wheatgrass and bluegrasses and wet areas by cattail and foxtail barley w/cover ranging from 0-80% and averaging 5%. Shrubs, big sage and rabbitbrush, are scarce (<1% cover). Cottonwoods are scattered at the base of spoils and in gullies (<1% cover).	
				Land Use: Grazing, wildlife, recreation (fishing and swimming).	

Table 7. (continued)

Mine	Location	Dates and Areas of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 4 (Coal)	Wyoming Sheridan County	'44 (92a spoils, 6a lake)	Mining: Stripping operation utilizing draglines. Reclamation: None. <u>Land Use Objectives:</u> Unknown.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 4200 ft. Vegetation: Sagebrush Steppe. Big sagebrush providing 40% shrub cover. Bluebunch wheatgrass, slender wheat- grass and snakeweed w/ 5% ground cover; overgrazed. Shunkbush on hills w/ cottonwood and green ash in washes. <u>Land Use:</u> Grazing.	34, 54, 99, 110
Big Horn Hidden Valley, Sec. 36, East Mine (Inactive)	Lat 44-57N Lon 107-39W				
<u>Donar</u> <u>Federal</u>	T54M 805M- S36 Monarch (USGS 7.5')			<u>Current</u> Spoils: Age 13 yrs. 15-35 ft. ridge and trough topography. Slope 20-40°. Scoria, shales, coal and sandy loam, well-drained and w/gully erosion on slopes. Pite flooded. <u>Natural Vegetation:</u> Highly varied ground layer cover. Sparse and scattered stands of bluegrasses, horse grasses, and various annuals. Cattail, bulrush, and arrowweed on edge of flooded pits. Aver- age cover 11%. <u>Land Use:</u> Grazing, wildlife, recreation (fishing and swimming).	

Table 7. (continued)

Mine	Location	Dates and Areas(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Source
WT 5 (Coal)	Wyoming Sheridan County	'48 (225a spoils, 17a in several lobes)	<u>Mining:</u> Dragline-operation. <u>Reclamation:</u> None. <u>Land Use Objectives:</u> Unknown.	<u>Pre-Mining</u> <u>Topography:</u> Hilly terrain, elev 4200 ft. <u>Vegetation:</u> Sagebrush Steppe. Dominated by big sagebrush providing 40% cover. Bluebunch wheatgrass and slender wheat- grass scattered providing 5% cover on overgrazed range. Shrubbrush on hills. <u>Land Use:</u> Grazing.	34, 54, 99, 110
Big Horn Midden Valley Sec. 36 West Mine (Inactive)	Lat 40-50N Lon 107-30W				
Omaha Federal	T578 803a- 836 Research (USGS 7.5')			<u>Current</u> <u>Spoils:</u> Age 29 yrs. 10-30 ft ridge and trough topography w/ slopes 20-40°. Shales, clays and gravels in well-drained spoils. Some pits flooded, gully erosion on slopes. <u>Natural Revegetation:</u> Big sage and rabbit- brush primarily on northfacing slopes (cover up to 20%, avg. 55%). Ground layer highly varied. Mostly cheatgrass brom w/ lamb's quarters, summercypress, Russelchistle and lettuce. Cattails in wet areas (cover 0-80%). <u>Land Use:</u> Grazing, wildlife, recreation (swimming and fishing).	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 6 (Coal) Brown & Williams (Inactive) Owner: Big Horn Mining Co.	Wyoming Sheridan County Lat 44-55N Lon 106-58W T57N R84W- S14	'43-'51 (50a spoils w/ 40a flooded pit, not included in new operations of Big Horn Mining Co.)	<u>Mining:</u> Pit mine, dragline and shovels used to expose coal then dozer-scraper operation. <u>Reclamation:</u> None. <u>Land Use Objectives:</u> Unknown.	<u>Pre-Mining</u> Topography: Flat area above the Tongue River. Elev 3850 ft. Vegetation: Grama-Needlegrass-Wheatgrass. Highly overgrazed range dominated by cheatgrass brome and silver sagebrush. <u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age approx 26-34 yrs. Flooded, linear pits surrounded by rows of linear spoils (25 ft high). Slope approx 40°, small flat area on top of spoils. Well drained with gully erosion on slopes. Rough surface composed of small boulders with decomposing shale and coal. Natural Revegetation: Perennial grasses, i.e. crested wheatgrass and Indian ricegrass, interspersed with abundant weeds: sunflower, cheatgrass brome, lamb's quarters, summer- cypress, Russian thistle, and lettuce providing ground cover from 0-50% (average 10%). Cottonwoods (10-20 ft) and some silver sage- brush sparsely distributed (<1a cover). <u>Land Use:</u> Grazing, wildlife and recreation (fishing).	28, 54, 99, 110

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NY 7 (Coal)	Wyoming	Early 1950's	Mining: Doser-scraper operation. Pits 20 ft deep.	Pre-Mining	34,
Colowyo Nos. 1 and 2 (inactive)	Sweetwater County	(96a)		Topography: Hilly terrain, elev 6700 ft.	54
	Lat 41-33N		Reclamation: None.	Vegetation: Saltbush-Greasewood.	99
	Lon 109-12W		Land Use Objectives: Unknown.	w/sagebrush, shadscale, greasewood, slender wheatgrass and Indian ricegrass dominating. Some stands of juniper on rock outcropping.	
Owner: Colowoyo Coal Company	T18N R105W- S 11,12			Land Use: Grazing.	
	Rock Springs (USGS 7.5')			Current	
				Spoils: Age 17 yrs. Randomly placed 30-ft mounds along pits, slopes commonly 30-40°; gully erosion on slopes promoted by motorcycles. Well-drained xeric conditions in sandy clays and shales with some exposed coal.	
				Natural Revegetation: Shrub layer low in diversity and sparse (<5%). Shadscale and greasewood concentrated in drainage paths and at the base of slopes. Ground layer barren (cover <1%); vegetation composed of Russian- thistle and halogeton.	
				Land Use: Motorcycle and 4-wheel-drive vehicle courses.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 8 (Coal)	Wyoming	'62-Present (1894a)	Mining: Dragline-dozzer-scraper operation, large surface mine, maximum depth 180 ft, average 140 ft.	Pre-Mining Topography: Rolling terrain, elev 5800 ft.	6, 28,
Dave Johnston Mine (Operating)	Converse County Lat 43-05N Lon 105-35W			Vegetation: Grama-Needlegrass-Wheatgrass. Big sagebrush, blue grama, junegrass, and needleandthread dominant species. Cover varies from 13 to 40%.	32, 48, 54,
Operator: Pacific Power and Light	T36W R75W-S21, 28, 33, 34 T36W R76W-S3, 10, 11 Highland Flats (USGS 15')		Reclamation: Spoils graded to near original contour, maximum slope 3:1, highwall reduced. Topsoil-stocked if necessary. Problem strata not segregated. Spoils topsoiled, mulched, no amendments or irrigation. Grasses drill seeded.	Land Use: Grazing.	76, 99, 179
			Land Use Objectives: Unknown.	Current Spoils: Age 0-15 yrs. Extensive areas of rolling hills, spoils graded to near natural terrain. Spoils topsoiled and surface smooth. Sandy-clay soils with some sandstone.	
				Reclamation: Spoils graded to near natural contour, topsoiled, mulched, crested, western and streambank wheatgrass drill seeded. Total area reclaimed 1012a. Revegetated areas vary considerably with age and location; ground layer cover varies from 0 to 35%. Dominant species include western, streambank, crested and bluebunch wheatgrasses. Some areas need reseeding.	
				Land Use: Idle.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 9 (Coal)	Wyoming	'32-'65	Mining: Pit operation; excavation by front end loader (one man operation).	<u>Pre-Mining</u>	28, 34, 54, 99
East Antelope Mine (Inactive)	Converse County	(18a pit, 4a pond)		Topography: Floodplain in hilly terrain.	
Owner:	Lat 43-30N	reclaimed	Reclamation: 5a to west of pit dozed flat, seeded with crested wheatgrass. No amendments.	Vegetation: Grama - Needlegrass - Wheatgrass w/big sagebrush and silver sagebrush in shrub layer (cover <5%). Ground layer composed of blue grama, cheatgrass brome, and needleandthread. Overgrazed.	
Pacific Power and Light	Lon 105-22W	(5a)			
	T41N R71W- S35		Land Use Objectives: Grazing.		
	Betty Reservoir (USGS 15')			Land Use: Grazing.	
				<u>Current</u>	
				Spoils: Age 12-45 yrs. Small well-drained mounds, surrounded by water; slope <30°. Pits flooded, highwalls not reduced. Gravelly to rocky surface composed of shale, sandstone and coal.	
				Reclamation: 5a to west of pit, dozed flat and seeded w/ crested wheatgrass, which pro- vides major portion of cover. Cheatgrass brome, and needleandthread have invaded reclaimed area; ground layer cover approx 60%.	
				Natural revegetation: Ground layer cover on unreclaimed area from 0% to 80% depending on the substrate and topography. Spoil mounds dominated by curlycup gumweed, yellow sweetclover, cheatgrass brome, Russianthistle, summercypress, and Indian ricegrass; edge of flooded pits w/ cattail and bulrush.	
				Land Use: Grazing.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 10 (Coal)	Wyoming	1940's	Mining: Dozer-scraper operation. 2 pits , 30 ft deep.	Pre-Mining	34, 54, 99
Elk Mountain Strip (Upper Sand Creek) (Inactive)	Carbon County Lat 41-45N Lon 106-25W	(>10a)	Reclamation: None. Land Use Objectives: Unknown.	Topography: Hilly terrain, elev 7500 ft. Vegetation: Sagebrush Steppe. Sagebrush, thickspike wheatgrass, and western wheatgrass.	
Owner: Anschutz Land and Cattle Co.	T21N R80W-S28,29, 32,33 Elk Mountain (USGS 7.5')			Land Use: Grazing. Current Spoils: Age approx 35 yrs. Spoils dozed up 35 ft ramps, average slope 35°, well-drained uplands, gully erosion on slopes. Highwalls not reduced, one pit flooded. Shale and sandstone surface with some coal deposits. Natural Revegetation: Non-consistent shrub cover (<1%) composed of sporadic stands of greasewood, Gardner saltbush, and rabbitbrush. Dry ground: cover sparse (<5%) of summercypress, Russiantistle, and Indian ricegrass. Wet ground: cover sparse of cattail, buttercup spikesedge, sedges, and bulrush. Land Use: Wildlife; deer and antelope sighted.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) Of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 11 (Coal)	Wyoming	1898-Present	Mining: Originally underground mine. Two main areas of surface mining with a total of 55 pits, 24 presently in operation. Dragline-doser and scraper-shovel operations. Problem strata not segregated, topsoil stockpiled.	Pre-Mining Topography: Hilly terrain, elev 7200 ft. Vegetation: Sagebrush Steppe. Sagebrush, western wheatgrass, greasewood, and antelope bitterbrush; more mesic areas with aspen, rose and basin rye.	34, 48, 54, 76, 95, 99
Elkol-Sorenson (Operating)	Lincoln County	1898-'50 underground; '50-present, surface (several hundred acres)	Reclamation: Spoils graded to max slopes of 3:1, highwall not reduced. Spoils topsoiled, broadcast seeded with native grasses, shrubs. No amendments, areas mulched and irrigated. Numerous test plots.	Land Use: Grazing, mining.	
Operator: Kammerer Coal Co.	Lat 41-46N Lon 110-37W T21N R117W Kammerer (USGS 15')		Land Use Objectives: Grazing.	Current Spoils: Age 0-27 years. Spoils in long, undulating configurations, some water present in depressions; pits in some areas to 50 ft. Surface material shale, clay, and weathered shale; areas smooth w/ rocks. Older spoils weathered and rounded. Reclamation: Numerous test areas begun in '65-'69; Kammerer reclamation began in '73. Spoils graded, broadcast seeded, some areas fertilized, mulched and irrigated. Revegetated areas dominated by crested and stream-bank wheatgrasses, cover highly varied to 37%.	
				Natural Revegetation: On '55 spoils encroachment of basin rye, aspen and rose; cattail and rush by water areas. Some sagebrush and bitterbrush.	
				Land Use: Wildlife; deer, badgers, marmots, and ground squirrels common on older spoils.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 12 (Coal)	Wyoming	'46-'51	Mining: Dozer-scraper operation. Large shallow pit with mounds of spoils piled on rim.	Pre-Mining Topography: Hilly terrain, elev 5700 ft.	34, 54, 94, 99
Gunn Quealy Mine (inactive)	Lat 41-30N Lon 109-14W	(1 mi x 75 ft. pit 30 ft deep, spoil mounds along pit)	Reclamation: None.	Vegetation: Sagebrush Steppe. w/sage, greasewood, desert shadscale, rabbitbrush, wolfberry and some juniper on rock out- crops. Ground cover dominated by slender wheatgrass and Indian ricegrass.	
Owner: Sweetwater Resources	T18N R105W-S23, 26,27		Land Use Objectives: Unknown.	Land Use: Grazing.	
Rock Springs (USGS 7.5')				Current Spoils: Age 26-31 yrs. A large area with diverse substrate and topography. Spoil mounds along pit highwalls; slopes mostly 40°. Well-drained xeric spoils composed of shales, sandstone and coal. Some gully erosion on slopes. Natural Revegetation: Rabbitbrush, greas- ewood (up to 6 ft), and shadscale in drainage areas and at base of spoils. Shrub cover in most areas is but in some areas up to 20%. Ground cover highest in drainage areas and at base of spoils; Indian rice- grass, cheatgrass brome, Russian thistle, and halogeton are dominants.	
				Land Use: Wildlife.	

Table 7. (continued)

(continued)

Table 7.	(continued)	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
Mine	Location	'37-'68 (70a)	Mining: Scraper-dozer operation, 2 pits (100 ft deep). Reclamation: None. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Hilly terrain. elev 7000 ft. Vegetation: Sagebrush Steppe. Sagebrush and western wheatgrass dominant. <u>Land Use:</u> Grazing and wildlife.	34, 54, 93, 99
MY 13 (Coal) (Inactive) Hana #1 Monolith (Inactive)	Wyoming Carbon County Lat 41-53N Lon 106-32W T22N 882W-817			<u>Current</u> Spoils: Age 9-40 yrs. Long, linear spoil rows adjacent to pits, slopes frequently up to 45°. Spoils well drained, moist, no water in pits. Evidence of some slope slippage. Substrate primarily sandy loam and shale. Large area w/diverse topography. <u>Reclamation:</u> None, but adjacent to large reclaimed area. Natural Vegetation: Highly varied vegetation cover according to exposure and substrate. Very sporadic shrub cover of shadscale saltbrush, greas- wood, and rabbitbrush (<1%). Ground layer of foxtail barley, Indian ricegrass, yellow sweetclover and bottlebrush squirreltail also sparse (5%) and variable. Land Use: Wildlife, ground squirrels common.	
Owner: Arch Minerals	Elmo (USGS 7.5')				

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WT 14 (Coal)	Wyoming	'73-Present	Mining: One pit, dragline- dozer operation. Problem spoils not segregated, topsoil stock- piled.	<u>Pre-Mining</u> <u>Topography:</u> Rolling terrain, elev 6300 ft. <u>Vegetation:</u> Sagebrush Steppe. Sagebrush w/bluestem wheatgrass, shadscale saltbush, and letterman needlegrass. <u>Land Use:</u> Sheep Grazing.	32, 48, 54, 76
Jim Bridger Mine (Operating)	Sweetwater County Lat 41-46N Lon 108-46W	(200a)	Reclamation: Spoils dozed to approximate original contours, topsoiled, disced, mulched, and native grasses drilled. No irrigation or amendments.	<u>Current</u> <u>Spoils:</u> Age 0-4 yrs. Long, undulating spoils near natural slopes. Spoils fairly rough consisting of shale, clay, and rock, with clay loams over surface. <u>Reclamation:</u> Only 20a to date, and not complete. Some experimental shrub and tree plantings have failed. Native grasses seeded but outcome uncertain.	
Operator: Bridger Coal	T21N R100W-S20 Superior (USGS 15')		<u>Land Use Objectives:</u> Sheep grazing.	<u>Land Use:</u> Wildlife.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 15 (Coal)	Wyoming	'74-Present	Mining: Dragline-doser	<u>Pre-Mining</u>	6,
Medicine Bow	Carbon County	(320a, 50	operation, combined with	Topography: Rolling terrain, elev 6450	32,
(operating)	Lat 41-57N	reshaped)	underground mining of	ft.	48,
	Lon 106-47W		some seams.		54,
Operator:					76
Medicine Bow Mining	T23W R83W-S32		Reclamation: Grade spoils to	Vegetation: Sagebrush Steppe. Sagebrush	
			approximate original contours,	w/western wheatgrass, Gardner's	
			highwall reduced. Topsoil	saltbush, and Douglas rabbitbrush. Cover	
			stockpiled, native grasses and	20-40%.	
			legumes drilledseeded and broad-		
			leaf. No mulching, irrigation	<u>Land Use: Grazing.</u>	
			or amendments.	<u>Current</u>	
			<u>Land Use Objectives: Grazing.</u>	Spoils: Age 0-3 yrs.	
				Spoils graded to original contour.	
				topsoiled. Surface material varied	
				consisting of clay-loam soils. Some	
				erosion present.	
				Reclamation: Spoils graded and topsoiled,	
				50a reshaped to date. Seeding to begin	
				in September '77.	
				<u>Land Use: Mining.</u>	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
NY 16 (Coal)	Wyoming	'40-'50 (140a, 7a in lakes)	Mining: Large area surface mine using shovel and dragline. Reclamation: None. Land Use Objectives: Unknown.	Pre-Mining Topography: Hilly terrain, elev 7100 ft. Vegetation: Sagebrush Steppe. Sagebrush with greasewood and western wheatgrass. Land Use: Grazing. Current Spoils: Age 27-37 yrs. Linear, rocky mounds, high ridges. Highwall not reduced. Slopes to 40°, well-drained upper spoils w/ 2 lakes. Gully erosion common. Soils composed of sand and stones, very rocky. Natural Revegetation: Highly varied cover. Sparse shrub stratum dominated by sagebrush and greasewood on uplands, rabbitbrush on lowlands. Ground cover of Indian ricegrass, western wheatgrass, foxtail barley, and Pacific giant wildrye, also highly varied. Land Use: Wildlife, antelope common.	34, 54, 91, 99
Magnet Pits 1 and 5 (Inactive)	Carbon County Lat 41-54N Lon 106-31W				
Owner: Rosebud Coal Sales Co.	T22N R21W-63,10 Elmo (USGS 7.5')				

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
W 17 (Coal) Boggett Pit No. 2 (Inactive)	Wyoming Carbon County Lat 41-52N Lon 106-30W	'40-'50 (As lake w/ old spoil)	Mining: Large area surface mine w/ shovel and dragline. Reclamation: None. <u>Land Use Objectives: Unknown.</u>	<u>Pre-Mining</u> Topography: Hilly terrain, elev 7100 ft. Vegetation: Sagebrush Steppe. Sagebrush with high cover (60%) of western wheatgrass, Indian ricegrass, needleandthread, greasewood and Gardner saltbush. <u>Land Use: Grazing.</u> <u>Current</u> Spills: Age 27-37 yrs. Linear, rocky scumdo, highway not reduced. Slopes as great as 45°. well-drained upper slopes w/old lake, gully erosion common. Soils composed primarily of sand and stones. <u>Natural Vegetation:</u> Highly varied cover w/very sparse shrub cover of sagebrush and greasewood. Ground cover of yellow sweetclover, Indian ricegrass, and foxtail barley less than 10%. <u>Land Use: Refuse disposal area.</u>	74. 54. 91. 99

Table 7. (continued)

Mine	Location	Dates and Areas(s) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WV 18 (Coal)	Wyoming Sheridan County	'43-'46 (40a reclaimed in '44, 25a creek bed w/pond).	Mining: Strip pit, final cut used as bed for Goose Creek. Reclamation: '44 spoils were dozed to less than 30", topsoiled (10 to 60 lb), trenched along contours, and drill seeded w/created wheat- grass. 10a planted w/ponderosa pine and Russian olive and other shrubs and trees.	<u>Pre-Mining</u> <u>Topography:</u> Stream bottom, elev 1800 ft. <u>Vegetation:</u> Grama-headgrass- wheatgrass, w/silver sagebrush and cheatgrass browse domination. Overgrazed.	28, 34, 54, 76, 99, 110
Donnell Big Horn Coal Co.	Lat 44-55N Lon 108-59W T57N R64E- S22 Acres (10528 7.5')		<u>Land Use Objectives:</u> Unknown.	<u>Current</u> <u>Spoils:</u> Age 17-34 yrs. Large slightly undulating area w/12-25% slopes. Well drained, including a pond in Goose Creek. Topsoil smooth and w/ contour ditches. <u>Reclamation:</u> Spoils treated and seeded as in plan; resulting vegetation dominated by created wheatgrass and cheatgrass browse. Area has developed a large amount of plant litter (plant cover: 66% litter, 14% growing vegetation). Reforested area (5%) cover.	
				<u>Land Use:</u> Wildlife.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 19 (Coal)	Wyoming	'75-present	Mining: Dozer-scrapers operation. Soil is stockpiled and stabilized w/vegetation.	Pre-Mining	34,
P.S.O. Mine	Sheridan County	(75a pit, 38a reclaimed spoils)		Topography: Bally terrain, elev 3600 ft.	47, 54, 99, 111
Operator: Ash Creek Mining (Public Service of Oklahoma)	Lat 44-59N Lon 106-57W T50N R44E-S22 ACME (Union 7.5')		Reclamation: '77-38a spoils (including 16a topsoil stockpile) treated as follows: 8 fertilizer 100#/a; drill seed grasses; oats and barley as nurse crop; perennial grasses; crested wheatgrass, stream- bank wheatgrass. '78-Area will be seeded with a dry- land pasture mixture of perennial grasses including western wheatgrass, crested wheatgrass, bluebunch wheat- grass, thickspike wheatgrass, and green needlegrass. Land Use Objectives: Unknown.	Vegetation: Creosote-budlegrass- wheatgrass. Shrub cover sagebrush (11a). Ground layer composed chiefly of bluebunch wheatgrass, and western wheatgrass. Kidney w/pandorea pine, shrubbrush and Rocky Mountain juniper. Drainage area w/green ash and cottonwood. Land Use: Grazing. Current	
				Spoils: Age 0-2 yrs. Dozed to conform to natural sloping terrain, topsoiled. Well-drained spoils w/little erosion.	
				Reclamation: Cover primarily oats w/summergrass invading (cover 43%). Land Use: Mining.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 20 (Coal)	Wyoming	'71-'72 (500a, mined and graded)	Mining: Auger and surface mining. Overburden removed w/scrapers.	<u>Pre-Mining</u>	34, 54, 99
Reliance Mines (Inactive)	Sweetwater County			Topography: Hilly w/arroyos, elev 6400-6500 ft.	
Operator: Rocky Mountain Energy	Lat 41-39N Lon 109-10W T19N R104W- S5,6,8 Reliance (USGS 7.5')		Reclamation: 500a graded '72, seeded w/crested wheatgrass. <u>Land Use Objectives:</u> Grazing.	Vegetation: Saltbush-Greasewood w/ shadscale saltbush, and sage. <u>Land Use:</u> Grazing. <u>Current</u>	
				Spoils: Age 5-6 yrs. Rolling or in some areas mesa-like, generally 20-25° slopes. Well-drained spoils of sandy loam and shales. Gully erosion on long steep slopes. Reclamation: Crested wheatgrass, Russian thistle and halogeton, all very sparse, 1% cover. One small (40a) area has a stand of grass >5%. Cover highly varied. <u>Land Use:</u> Grazing.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 21 (Coal)	Wyoming	'69-'71 (40a)	Mining: Scraper-dozer operation, topsoil stockpiled.	<u>Pre-Mining</u>	32,
Rimrock Pits	Carbon County	'72-reclaimed		Topography: Hilly terrain, elev	34,
No. 1	Lat 41-54N		Reclamation: Dozer grade spoils to reduce highwall, recontour. Topsoil and drill seed crested and desert wheatgrasses, Indian ricegrass, and smooth brome.	7000 ft.	48,
(Inactive)	Lon 106-38W			Vegetation: Sagebrush Steppe. Sagebrush and western wheatgrass dominant.	54,
Operator:	T22N R22W-S4				92,
Energy Development	Tennile Spring				99
Co.	(USGS 7.5')		Land Use Objectives: Grazing.	<u>Land Use: Grazing and wildlife.</u>	
				<u>Current</u>	
				Spoils: Age 6-8 yrs. Large area with rolling topography and gentle slopes (20%). Well-drained spoils w/minimal erosion. Soils composed of sandy clay loams w/ some exposed coal.	
				Reclamation: Dozer graded, then topsoiled and seeded. Fairly uniform stand of crested and desert wheat- grasses, smooth brome, and Indian ricegrass. Ground layer cover up to 60%.	
				<u>Land Use: Wildlife, antelope observed.</u>	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 22 (Coal)	Wyoming	'69-'71 (50a)	Mining: Scraper-dozer operation, topsoil stockpiled.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 7000 ft. Vegetation: Sagebrush Steppe. Sagebrush and western wheatgrass dominant. <u>Land Use:</u> Grazing and wildlife.	32, 34, 48, 54, 92, 99
Rimrock Pits No. 2 (Inactive)	Carbon County Lat 41-54N Lon 106-30W	'72-reclaimed	Reclamation: Dozer grade spoils to reduce highwall, recontour. Topsoil and drill-seed created and desert wheatgrasses, Indian ricegrass, and broom.		
Operator: Energy Development Co.	722N R02W-54 Tensile Spring (USGS 7.5')		<u>Land Use Objectives:</u> Grazing.	 <u>Current</u> Spoils: Age 5 yrs. Large area, nearly flat spoils w/ little erosion. Soils composed of sandy clay loams w/some exposed coal. Reclamation: Dozer graded, then topsoiled and seeded. Fairly uniform stand of crested and desert wheatgrasses, smooth broom and Indian ricegrass. Ground layer cover up to 60%. <u>Land Use:</u> Grazing and wildlife: antelope observed.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 23 (Coal)	Wyoming	'71-Present	Mining: Dozer-scraper operation, problem strata segregated, topsoil stockpiled.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 7000 ft. Vegetation: Sagebrush Steppe. Sagebrush and western wheatgrass dominant. <u>Land Use: Grazing.</u> <u>Current</u> Spoils: Age 0-6 yrs. Reclamation: In progress. Grading as of 7/77. <u>Land Use: Mining.</u>	32, 34, 49, 54, 92
Rimrock Pits Nos. 3-7 (operating)	Carbon County Lat 41-53N Lon 106-37W	'71-Present (300a) reclamation in progress	Reclamation: Dozer grade spoils to 3ft, topsoil, and disc. No amendments or irrigation. Drill seed Rosana western wheatgrass, sodar streamback wheatgrass, thickspike wheatgrass, and Indian ricegrass. <u>Land Use Objectives: Grazing.</u>		
Operator: Energy Development Co.	T22N R82W-S10 Tennille Spring (USGS 7.5')				

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 24 (Coal)	Wyoming Carbon County	'74-'76 (100a) reclaimed '76	Mining: Doser-scraper operation, two pits. Problem strata segregated, topsoil stockpiled. Reclamation: Doser grade spoils to 3:1, topsoil, and disc. No amendments or irrigation. Drill seed Bosana western wheatgrass, sodur streambank wheatgrass, thickspike wheatgrass, and Indian ricegrass. <u>Land Use Objectives:</u> Grazing.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6950 ft. Vegetation: Sagebrush Steppe. Sagebrush and western wheatgrass dominant. <u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age 1-3 yrs. Graded, topsoiled, large gently sloping area. Reclamation: Seeded in fall '76. No information on success. <u>Land Use:</u> Wildlife.	32, 34, 48, 54, 92
Marrock Pits-Sec 5 (Inactive)	Lat 41-54N Lon 106-39W				
Operator: Energy Development Co.	T22N R82N-S5 Tennile Spring (USGS 7.5')				

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 25 (Coal)	Wyoming	'75-'76 (100a)	Mining: Dozer-scraper operation, one pit. Problem strata segregated, topsoil stockpiled.	Pre-Mining Topography: Hilly terrain, elev 6700 ft.	32, 34, 48, 54, 92
Blair Rock Pits-Sec 7 (Inactive)	Carbon County Lat 41-54N Lon 106-39W	'76-reclaimed	Reclamation: Dozer grade spoils to 3:1 topsoil, disc. No amendments or irrigation. Drill-seed Bosana western wheatgrass, Sodar streambank wheatgrass, thickspike wheatgrass, and Indian ricegrass.	Vegetation: Sagebrush Steppe. Sagebrush and western wheatgrass dominant.	
Operator: Energy Development Co.	T22N R62W-67 Tennille Spring (USGS 7.5')		Land Use Objectives: Grazing.	Land Use: Grazing. Current	
				Spoils: Age 1-2 yrs. Graded, topsoiled; large, gently sloping area.	
				Reclamation: Spoils treated as in re- clamation plan; area seeded in fall '76.	
				Land Use: Wildlife.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 26 (Coal)	Wyoming	'60-'64 (108a)	Mining: Large area surface mine, first cut made by dozer, then dragline used for removing overburden.	Pre-Mining	1.
Rosebud No. 1,2 (Inactive)	Carbon County	(3a lake w/ 105a spoil) '74 - reclaimed	Reclamation: Highwall reduced, area recontoured with slopes about 20%. Site drill-seeded w/grasses and irrigated. Shrubs including Russian olive and chokecherry planted in some areas.	Topography: Hilly terrain, elev 7100 ft.	6, 32, 34, 48, 54, 91, 99
Owner: Rosebud Coal Sales Co.	Lat 41-52N Lon 106-34W T22N R82W-S13		Land Use Objectives: Grazing.	Vegetation: Sagebrush Steppe. Sagebrush with western wheatgrass, Indian ricegrass, and anahweed.	
	Elmo (USGS 7.5')			Land Use: Grazing.	
			Current		
			Spoils: Age 13-17 yrs. Long, linear spoils, largely flat on top with side slopes averaging 25-30°. Highwall not reduced, water present in 3a lake, upland spoils well drained with gully erosion on steep slopes. Soils range from sands to clays w/ some exposed coal.		
			Reclamation: Spoils diked, highwall reduced; created wheatgrass drill seeded, black cherry and Russian olive planted in '64. No amendments, irrigated 2 years. Varied shrub cover (up to 40%) composed of Russian olive (10 ft tall), chokecherry, rabbitbrush, shadscale, saltbush, and Gardner saltbush. Ground layer also fairly uniform (up to 50%) composed of crested wheatgrass, Indian ricegrass, and Pacific giant wildrye. Cover low in many areas.		
			Land Use: Grazing.		

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources	
WY 27 (Coal)	Wyoming	'64-Present (3160a total)	Mining: Large area surface mine, first cut made by dozer, then dragline used for removing overburden. Topsoil segregated and stockpiled.	Pre-Mining	1,	
Rosebud	Carbon County	Reclaimed:			6,	
Nos. 4-15 (Operating)	Lat 41-58N Lon 106-30W	100a - '73 120a - '74 227a - '75 113a - '76	Reclamation: Soil stockpiled, highwall reduced, area recontoured with slopes about 20%. Topsoil added, drill native grasses, fertilize and irrigate.	Topography: Hilly terrain, elev 7100 ft. Vegetation: Sagebrush Steppe. Area dominated by big sagebrush, rabbit- brush, and western wheatgrass.	32, 34, 46, 54, 91, 99	
Operator: Rosebud Coal Sales Co.	T22N R81W-82,3 T23N R81W-821, 27,28,33-36. Elmo Congo West (USGS 7.5')		Land Use Objectives: Grazing.	Land Use: Grazing. Current		
				Spoils: 0-13 yrs. Large, undulating rows often w/ moisture basins. Slopes average 9:1, maximum 3.5:1. Spoils well drained, gully erosion common on steeper slopes. Newer areas topsoiled w/sandy loams, older areas have sandy and stony surfaces w/shale or coal exposed.		
				Reclamation: Spoils dozed, topsoiled, disced, mulched and drill seeded. Some experimental planting of trees and shrubs, wood chips used as mulch, irrigation on some plots. Cover varies, generally less than 5%. Ground cover of Russian thistle, summercypress, crested wheatgrass, and yellow sweetclover on uplands; some invasion of cattail, bulrush and bluegrass in drainages.		
				Land Use: Idle.		

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 20 (Coal)	Wyoming Carbon County	'72-Present (600a, 280a reclaimed)	<u>Mining:</u> Large area mine, dragline- shovel operation. Topsoil stock- piled, problem strata segregated.	<u>Pre-Mining</u> <u>Topography:</u> Rolling terrain, elev 6600 ft. <u>Vegetation:</u> Sagebrush Steppe. Big sagebrush with Indian ricegrass, needleandthread, and junegrass. Cover 30-45%.	6, 28, 32, 54, 76
Seminole 1 (Operating)	Lat 41-52N Lon 106-46W		<u>Reclamation:</u> Spoils dozer-graded to approximate original contour, highwall reduced, maximum slope 3:1. Spoils topsoiled, native grasses, legumes, shrubs drill and broadcast seeded. No amendments, irrigation, or mulch.	<u>Land Use:</u> Grazing.	
Operator: Arch Mineral	T22N R83W T22N R84W Walcott (USGS 15')		<u>Land Use Objectives:</u> Grazing.	<u>Current</u> <u>Spoils:</u> Age 0-5 yrs. Long undulating spoils approximating original contours, gentle slopes, long ridges. Spoils composed of shale, and clay; surface rough. Most areas not topsoiled. No serious erosion problems. <u>Reclamation:</u> Spoils graded, topsoil not replaced in many instances. Areas broadcast seeded with crested wheatgrass, slender wheatgrass, and yellow sweetclover. Cover fairly uniform, but varies with age of seeding from 3-25%. Some natural invasion noted. <u>Land Use:</u> Mining, wildlife.	

Table 7. (continued)

Mine	Location	Dates and Areas of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WT 29 (Coal)	Wyoming Carbon County	'75-Present (500a, 200a reclaimed)	Mining: Dragline-scraper-doser operation. 1 area pit, highwall reduced, problem spoils segregated.	<u>Pre-Mining</u> <u>Topography</u> : Rolling terrain, elev 7250 ft. <u>Vegetation</u> : Sagebrush Steppes, Sagebrush, western and bluebunch wheatgrass, shadscale saltbush, Douglas rabbitbrush, and junegrass. Cover fairly uniform, 35-40%.	6, 28, 32, 34, 76
Emmons 2 (Operating)	Lat 41-54N Lon 106-13W		Reclamation: Spoils graded to approximate original contours, topsoil stockpiled and replaced. Maximum slope 3:1. Native grasses, legumes, shrubs drill and broadcast seeded. No amendments, mulch, or irrigation. Reclamation proceeds as mining progresses.	<u>Land Use</u> : Grazing.	
Operator: Arch Minerals	T22W 10N-84, 8 Barren (USGS 15')		<u>Land Use Objectives</u> : Grazing.	<u>Current</u> <u>Spoils</u> : Age 0-2 yrs. Long, narrow slopes, approximating original contours. Some areas topsoiled, slopes to 30%. Surface composed of mixture of clay and topsoil, some water and wind erosion. <u>Reclamation</u> : Spoils graded, topsoiled, drilled, seeded with thickspike, streambank, western, and crested wheatgrasses. Current conditions vary. Vegetation on areas seeded fairly uniform; cover varies from 8 to 23%.	
				<u>Land Use</u> : Mining, wildlife.	

(continued)

Mine	Location	Dates and Areas (a) of Disturbance	Mining and Reclamation Plans	Information	
				Pre-Mining and Current Conditions	Post 1966
WY 36 (Coal)	Wyoming	'64-'73 (100a) '73-reclaimed	Mining: Dozer-scraper operation with some topsoil stockpiled.	Pre-Mining	34.
Union Pacific No. 1 (Inactive)	Carbon County Lat 41-53N Lon 106-37W		Reclamation: Dozer grade to 4:1 and 3:1, some topsoiling. Seeded with crested wheatgrass and smooth brome.	Topography: Hilly terrain, elev. 1000 ft, some rock outcropping.	34. 34. 92. 99
Operating Energy Development Co.	82.28 N47°-21.0, 15 W100°-7.5'		Land Use Objective: Grazing.	Vegetation: Sagebrush Steppes. Predominantly aspen and western wheatgrass. Other shrubs include spiny hawthorn, gooseberry, mountain sambucus, and serviceberry.	
				Land Use: Grazing and wildlife.	
				Current	
				Spills: Age 4-13 yrs. A long, linear ridge approx. one-quarter mile wide, one side adjacent to natural drop-off. Outer slopes of 4:1 to 3:1. Well drained and aerif. Gully erosion common. Soils of sandy loam.	
				Reclamation: Dozer graded spills, topsoiling in some areas, seeded. No shrub cover and sparse and varied ground cover. Seeded areas show some success, i.e., wheatgrass present. Other areas barren or dominated by Russian thistle.	
				Land Use: Grazing and wildlife.	

Table 7. (continued)

Mine	Location	Dates and Areas of Disturbances	Mining and Reclamation Plans	Pit-Mining and Current Conditions	Information Sources
WY 31 (Coal)	Wyoming	'40-'70 (50a-10a pit, 15a spoils, and 25a reclaimed during '73 and '75)	Mining: Pit mining w/ shovel, scraper, and front end loader. Reclamation: '73 and '75 dozed to level piles w/20-40° outer slopes. Topsoiled w/loamy material in some areas. Drilled w/streambank, western, and crested wheatgrasses.	<u>Pit-Mining</u> Topography: Rolling terrain, elev. 3000 ft. 47. Vegetation: Grass-needlegrass-wheatgrass. Silver cholla (CCA on soil). Ground layer composed of western wheatgrass and needlegrass. <u>Land Use:</u> Grazing.	28, 34, 54, 59
Walch Mine (Inactive)	Lat 44-5400 Lon 107-420				
Owner:	WY 78 8850-022				
W. Welch	Monarch (USGS 7.3')				
			<u>Land Use Objectives:</u> Grazing.	<u>Current</u> Spoils: Age 3-29 yrs. Dozed to flat-topped piles w/20-40° slopes. Composed of sandy loam, shale, and coal; some areas w/topsoil. Well-drained spoils w/polly erosion on slopes. Pit w/small amount of water in bottom (cla). Reclamation: '73 and '75. Crested wheatgrass w/frequent occurrence of western wheatgrass and cheatgrass bromes, the latter very common in some areas. Fairly uniform cover. Natural Vegetation: Oldest (age approx. 30 yrs) unreclaimed spoils contain exposed coal poorly vegetated w/silver sage, western wheatgrass and summergrass. Other spoils colonized by summergrass and cheatgrass bromes. <u>Land Use:</u> Grazing.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 32 (Coal)	Wyoming Campbell County	'25-Present (20a abandoned by '59, 4a reclaimed, 100a active pit).	Mining: Open pit scraper-doser operation. Overburden is back- filled into inactive portions of pit.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 450 ft.	28, 32, 47, 76, 99
Operator: Wyodak Resource Development Co.	Lat 44-17N Lon 105-23W T50N R71W-S28 Gillette East (USGS 7.5')		Reclamation Plan: Segregate problem strata, reduce highwall, doze spoils to approximate original contour, topsoil approx. 18 in, and drill w/ grasses and legumes. Land Use Objectives: Unknown.	<u>Vegetation</u> : Grama-Needlegrass-Wheatgrass w/blue grama, needleandthread, western wheatgrass. Some areas w/abundant silver sagebrush. <u>Land Use</u> : Grazing. <u>Current</u> Spoils: Age 0-52 yrs. Abandoned spoil area (20a) approximately 1300 x 700 ft; spoil tops level to 10° and spoil sides are 10-20°. Substrate of silt loams, gravel, or coal; well drained, xeric, and w/gully erosion. Reclaimed area (4a) flat w/substrate of gravelly material. Reclamation: 4a level spoil drilled w/ created wheatgrass and alfalfa. These species and summercypress have developed a uniform cover of 10%. Natural Revegetation: Spoils dominated by foxtail barley, cheatgrass broom, and summer- cypress; Indian ricegrass and curlycup also common in the ground layer. Ground layer cover varied from 0-80% with average of 50%. Silver sage and rabbitbrush are invading spoil sideslopes (cover average <1%). <u>Land Use</u> : Horses on abandoned spoils; reclaimed spoils idle.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 33 (Coal)	Wyoming	'57-'60-present	Mining: Current and future: Dragline and shovel to remove overburden and segregate problem strata. Coal removed by dozer- scraper operation.	Pre-Mining Topography: Rolling to hilly, elev 3800 ft.	28, 34, 76, 99, 110
Zowada Pit (Operating)	Sheridan County Lat 44-55N Lon 106-59W	(300a disturbed)	Reclamation: 1976 and future: Remove and stockpile topsoil, stabilize if necessary; grade spoils to near original con- tour; replace topsoil (18"), blade, disk, fertilize and drill w/;	Vegetation: Grama-Needlegrass-Wheatgrass (on flat areas) and Eastern Ponderosa Forest (on hillsides). Sagebrush, blue- bunch wheatgrass, and slender wheatgrass dominate on flat areas. Hillsides are dominated by ponderosa pine associated w/skunkbush and bluebunch wheatgrass.	
Operator: Big Horn Coal Co.	T57N R84W- S22		western wheatgrass bluebunch wheatgrass thickspike wheatgrass green needlegrass slender wheatgrass Whitmar bunchgrass pubescent wheatgrass smooth brome sanfoin.	Land Use: Grazing and wildlife.	
	Kewee (USGS 7.5')		Land Use Objectives: Grazing.	Current Spoils: Age 0-20 years. (1974) Large flat area w/exception of 10a on 46° north-facing slopes. Topsoil smooth, sandy loam, well drained. Some gully erosion on steep slope. (1976) Spoils, 20a area w/north-facing slope well drained; substrate of sandy loam.	
				Reclamation: 1974 fall (25a) dozed to flat top w/45° sides on N slope. Top- soiled and drilled w/crested wheatgrass. Very few weeds. Cover 11% w/54% plant litter. (1976) (20a) spoils treated and seeded as in plan. Russianthistle and summer- cypress dominate (80% cover) w/crested wheatgrass interspersed (1% cover).	
				Land Use: Grazing.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
W7 34 (Uranium)	Wyoming	'56-'71 (20a)	Mining: Shallow pit operation. Average depth 11 ft, maximum 35 ft.	Pre-Mining	54,
Andria Group (Inactive)	Fremont County		Mine closed in '63, reopened in '71. Pits backfilled.	Topography: Hilly terrain, elev 6600 ft.	65, 82, 99
Owner: Federal American Partners	Lat 42-46N Lon 107-41W		Reclamation: Spoils leveled and drill seeded. No amendments.	Vegetation: Sagebrush Steppe. Big sagebrush dominant and with 40% cover. Ground layer of bluebunch wheatgrass, junegrass and sandberg bluegrass.	
	T32N R91W-S1, 12		Land Use Objectives: Grazing.	Land Use: Grazing and wildlife.	
	Puddle Springs (USGS 7.5')			Current	
				Spoils: Age 6-21 yrs. Dozed spoils present in natural draw, slope <10%, well drained, no water in shallow pit. Some erosion down draw; pit w/ sloughing highwalls. Gravely silt loams.	
				Reclamation: Spoils leveled and seeded in 1971, total 4.4a; 15.6a abandoned. Rabbitbrush and fringed sage varied (<5% cover); ground layer of crested wheatgrass, bluebunch wheatgrass and Indian ricegrass, cover up to 20%.	
				Land Use: Grazing.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 35 (Uranium)	Wyoming	'55-'71	Mining: Dozer-scraper operation in	Pre-Mining	54,
Arrowhead Group	Fremont County	(15a)	pit with a maximum depth of 130 ft.		65,
(Inactive)	Lat 43-25N		Most production was underground.	Topography: Hilly terrain, elev 6600 ft. 85	
Owner:	Lon 107-92W		Reclamation: None.	Vegetation: Sagebrush Steppe.	
Western Nuclear,	T40N R92W-S28		Land Use Objectives: Unknown.	Land Use: Grazing.	
Inc.	DePass			Current	
	(USGS 7.5')			Spoils: Age 6-22 yrs.	
				Natural Revegetation: Unknown.	
				Land Use: Unknown.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 36 (Uranium)	Wyoming	'57-'65 (35a- 10a pits, 25a spoils)	Mining: Dozer-scraper operation; 2 shallow pits, max depth 30 ft.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 5000 ft. Vegetation: Grama-Needlegrass-Wheatgrass. w/western wheatgrass dominating stands of silver sagebrush and needleandthread. Yucca, skunkbush, and prairie sandreed are occa- sional on lighter soils. <u>Land Use:</u> Grazing.	65, 99
Betty Lou Group (Inactive)	Converse County Lat 43-11N Lon 105-38W		Reclamation: None. <u>Land Use Objectives:</u> Unknown.		
Owner: Kerr McGee Nuclear (lease) Roy Baker	T37W R7N-59 Highland Flats (USGS 15')			<u>Current</u> Spoils: Age 12-20 years. 3-5a piles, tops slope 0-15°, sides to 30°, sandy w/a small amount of clay. Well drained, little erosion. Pits w/highwalls; no water but some moist areas. Natural Revegetation: Lamb's quarters, cocklebur, curlycup gumweed, and snakeweed provide 50% ground cover in pits. Slender wheatgrass w/cover up to 80% on moist areas. Indian ricegrass and scurfpea provide 0-40% cover on slopes (average 10% cover). Highly varied cover. <u>Land Use:</u> Grazing and wildlife antelope sighted.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 37 (Uranium)	Wyoming	'56-'66 (10a in	Mining: Deep open pit in Gas Hills	Pre-Mining Topography: Hilly terrain, elev 6750 ft. Vegetation: Sagebrush Steppe. Up to 50% cover by sagebrush w/bluebunch wheatgrass and western wheatgrass dominating the ground layer. <u>Land Use: Grazing.</u>	54, 65, 85, 99
Bountiful Mine (Inactive)	Freemont and Matrona Counties	pit, 20a in spoils)	depth 120 ft. Dozer-scraper operation in side of hill w/spoils dozed out of base of hill.		
Owner: Western Nuclear, Inc.	Lat 42-47N Lon 107-30W T33N R89W-S27,28 Erway Basin (USGS 7.5')		Reclamation: None. <u>Land Use Objectives:</u> Unknown.		
				<u>Current</u> Spoils: Age 11-21 yrs. Pit, averaging 120 ft deep, in side of hill; spoil dozed out of pit at base of hill into a 20 ft mesa-like configuration. Side slope approximately 20°. Rough sandy clay loams w/gravel and small boulders. Well drained and xeric. Natural Revegetation: Spoils sparsely vegetated by widely scattered 2-ft clumps of Green's lupine. Other invading species of low abundance were Indian ricegrass, Side bottlebrush squirreltail and phacelia. Side slopes were more densely vegetated; species included big sagebrush, bluebunch wheatgrass, and western wheatgrass. <u>Land Use:</u> Grazing and wildlife; sightings included antelope and sage grouse.	

(continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 10 (Uranium)	Wyoming Fremont County	'55-'69 (125a)	Mining: Deep open pit in Wind River formation of Gas Hills, average pit depth 135 ft. In situ heap leaching conducted.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6500 ft.	54, 65, 85, 99
Bullrush Mines (Inactive)	Lat 40-48N Lon 107-36W		<u>Reclamation:</u> None.	<u>Vegetation:</u> Wheatgrass-Needlegrass- Shrub Steppe. W/low cover (5-10%) of sage and a ground layer of needle anthread, Indian ricegrass and western wheatgrass.	
Owner: Western Nuclear, Inc.	T33N R90W-S29 Puddle Springs (USGS 7.5')		<u>Land Use Objectives:</u> Unknown.	<u>Land Use:</u> Grazing.	
				<u>Current</u> <u>Spoils:</u> Age 8-22 yrs. Large mesa and ramp-like areas with slopes commonly up to 40°. Well- drained sandy and gravelly clay loams frequently w/gully erosion on long or steep slopes.	
				<u>Natural Revegetation:</u> Vegetation poorly developed (cover <1%); Indian ricegrass is scattered and very infrequent.	
				<u>Land Use:</u> Cattle and wildlife; antelope sighted.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WT 39 (Uranium)	Wyoming	'59-'61 (56a- 11a in pit and 45a spoil)	Mining: Combined open pit and underground operation. Maximum pit depth 400 ft.	<u>Pre-Mining</u>	54, 65, 82, 99
Buss Russ (Inactive)	Matrona County Lat 42-47N Lon 107-30W	'75-'76 (24a of spoil redisturbed and 6a of ore pad disturbed by exploratory drilling.	Reclamation: None. <u>Land Use Objectives</u> : Unknown.	<u>Topography</u> : Hilly terrain, elev. 6700 ft. Vegetation: Sagebrush steppe; up to 40% cover by sagebrush w/bluebunch wheatgrass and western wheatgrass dominating the ground layer. <u>Land Use</u> : Grazing.	
Owner: Federal American Partners	T13N 89W-827 Ervey Basin (USGS 7.5')	Area is scheduled for mining in '78		<u>Current</u> Spoils: Age 16-18 yrs. Pit w/sloping highwalls; spoils 15-20 ft high and slopes averaging 10-15°. Well-drained rough sandy loams w/rocks and boulders. Gully erosion on steep slopes. Natural Revegetation: Sagebrush and rabbitbrush averaging approx. 20% on spoil tops, denser on side slopes. Indian ricegrass, bluebunch wheatgrass, western wheatgrass, Green's lupine, foxtail barley, and Hooker's sandwort commonly scattered on upland spoils. <u>Land Use</u> : Grazing and wildlife; antelope and sage grouse sighted.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 40 (Uranium)	Wyoming Carbon County	'54-'63 (10a)	Mining: Shallow pit operation. Average depth 30 ft, maximum 80 ft. 3 small pits.	<u>Pre-Mining</u>	54, 65
Cedar Mills- Jack Rabbit (Inactive)	Lat 41-02N Lon 107-55W		Reclamation: None.	<u>Topography</u> : Hilly terrain, elev 6600 ft. <u>Vegetation</u> : Juniper-Pinyon Woodland.	
Owner: Trace Elements Corp.	T12N R92W-S5 T13N R92W-S32		<u>Land Use Objectives</u> : Unknown.	<u>Land Use</u> : Unknown. <u>Current</u>	
	Poison Basin (USGS 7.5')			<u>Spoils</u> : Age 14-23 yrs. <u>Reclamation</u> : Unknown. <u>Land Use</u> : Unknown.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 41 (Uranium)	Wyoming				
Clyde-Bret-Looco (Inactive)	Fremont County	'60-'76 (total distur- bance 210a; 152a spoils, 65a back- filled pit)	Mining: Open pit operation, average depth 210 ft. Pit backfilled as mining progresses. Reclamation: Spoils leveled, no topsoil added, fertilized and broadcast seeded with following mixture: Intermediate wheatgrass, yellow sweetclover, crested wheatgrass, Russian wildrye, green needlegrass, sandlove grass.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6600 ft. <u>Vegetation</u> : Sagebrush Steppe. <u>Land Use</u> : Grazing and wildlife.	54, 65, 82
Operator: Federal American Partners	T12W R91W-S14, 23, 24 Puddle Springs (USGS 7.5')		<u>Land Use Objectives</u> : Grazing.	<u>Spoils</u> : Age 1-7 yrs. Slightly undulating spoils, well- drained, sandy soils. <u>Reclamation</u> : 5a leveled and seeded in '71, currently crested wheatgrass dominates, but cover is sparse. Almost no cover on areas not seeded. <u>Land Use</u> : Grazing and wildlife.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 42 (Uranium)	Wyoming	'59-'76	Mining: Deep pit, average 280 ft deep, until '72. Adits from pit walls were utilized for underground mining from '72-'76. In situ leaching of low grade ore in waste pits was conducted from '67-'76.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6600 ft. Vegetation: Sagebrush Steppe, w/ wheatgrass, Indian ricegrass, and needleandthread. <u>Land Use: Grazing.</u>	54, 65, 85, 99
Day Loma (Inactive)	Lat 42-45N Lon 107-40W	(200a +, 50a in pits)	Reclamation: 5a were leveled and seeded w/crested wheatgrass in early '70's; further reclamation will be conducted in the future.	<u>Current</u> Spoils: Age 1-19 yrs. Spoils piled to 50 ft, extensive area mostly w/gentle slopes. Deep pit with sloughing highwalls and some areas water filled. Well-drained sandy and gravelly clays. Gully erosion common on steep or long slopes. Natural Revegetation: Nearly devoid of vegetative cover; some drainage paths with foxtail barley. Several water impoundments w/cattail and/or bulrush. Reclamation: Approx. 5a seeded w/crested wheatgrass; cover developed by that species from 0-40%, average cover is 10%. Few other species are present.	
Owner: Western Nuclear, Inc.	T32N 89W-824 Coyote Springs (USGS 7.5')		<u>Land Use Objectives: Grazing.</u>	<u>Land Use: Grazing and wildlife; ducks noted on flooded areas, antelope on spoil.</u>	

Table 7. (continued)

Mine	Location	Dates and Area(s) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WV 43 (Uranium)	Wyoming Fremont County	'59-'65 (87a) '65-'69 (Under- ground)	Mining: Combined deep pit and underground mine.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 4400 ft. Vegetation: Sagebrush Steppe. Primarily sagebrush with various weatgrasses and needlegrass in ground layer. <u>Land Use</u> : Grazing.	54, 65, 66 99
Frazier-Lemay Group (Inactive)	Lat 42-43m Lon 107-14W		Reclamation: Doser used to flatten spoils. Site topsoiled in '72; no seeding or revegetation attempted.		
Operator: Lucky Mc Uranium Corp.	T338 8930-826, 27, 34, 35 Gas Hills (about 7.5')		<u>Land Use Objectives</u> : Unknown.		
			<u>Current</u> Spoils: Age 12-18 yrs. Essentially level, flat spoil areas. Sandy topsoil w/wind-deposited) mass of sand. Very eric and well drained. <u>Reclamation</u> : Spoils flattened by doser; topsoiled in '72. No seeding or other revegetation attempts. <u>Natural Vegetation</u> : Scattered invasions of sagebrush. Varied ground layer cover composed of Indian ricegrass, needleanthred, Sandberg bluegrass, and foxtail barley. Cover 30%.		
			<u>Land Use</u> : Wildlife; antelope commo.		

Table 7. (continued)

Mine	Location	Dates and Acreage of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 44 (Uranium)	Wyoming	'55-'60	Mining: Doser-scraper operation, several deep pits, max on w/two unreclaimed. depths 175 to 275 ft.	Pre-Mining	65, 98, 111
Getty Oil Mine includes: Dave group	Carbon County	30a and 100a-Spoils reclaimed fall of '71, 600a; '72, 300a)	Reclamation: Spoils dozed, topsoiled, and fertilized. Drilled/seeded.	Topography: Hilly, elev 7000 ft.	
Section 10, and YUC #1 claims (Inactive)	Lat 42-19N Lon 106-48W T27N R78W-S27			Vegetation: Grass-Medicago-Wheatgrass. Variable cover w/dominants of western wheatgrass, blue grass, and needlethread.	
Owner: Petrochemicals	Beaumont Reservoir (USGS 7, 5')		Land Use Objectives: Unknown.	Land Use: Grazing.	
				Current	
				Spoils: Age 9-22 yrs. Flat, mesa-like spoils w/undulating top. Slope up to 45° on '72 spoils and 30° on '71 spoils. Sand and gravel below topsoil. Pits w/water. Spoils well drained. Daily erosion on outer slopes.	
				Reclamation: Dozed and topsoiled 3 in on top, 8 in on slopes. Fenced, fertilized and drilled/seeded. Ground cover composed of various wheatgrasses including bluebunch, slender, crested, and thickspike. Approx 60% cover.	
				Land Use: Wildlife; antelope common.	

Table 7. (continued)

Mine	Location	Dates and Acres(s) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 45 (Uranium)	Wyoming Fremont County	'54-present (30a)	<u>Mining</u> : Deep pit operation, average depth 180 ft., 12 pits, 2 active, others backfilled.	<u>Pre-Mining</u> Topography: hilly terrain, elev 6600 ft.	54, 65, 66
Green River Claims (Bail, Bart, Eagle, and Shoal claims) (Operating)	Lot 42-69M Lm 107-37M		<u>Reclamation</u> : Dose spoils to 3:1 slope, compact and drill seed. Mixture:	<u>Vegetation</u> : Sagebrush Steppe, Sagebrush w/western wheatgrass, blondeweed wheatgrass and junegrass.	
Operator: Lucky McSteamie Corp.	T12B 8910-01,12 T12B 8908-06,7 Ervey Basin (USGS 7.5')		thickspike wheatgrass, streambank wheatgrass, western wheatgrass, small burst, yellow sweetclover, winterfat, desert bittersweet.	<u>Land Use</u> : Grazing. <u>Current</u>	
			<u>Land Use Objectives</u> : Grazing.	<u>Spills</u> : Age 0-23 yrs. Backfilled pits with various slopes.	
				<u>Reclamation</u> : None to date.	
				<u>Land Use</u> : Mining - Idle.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 46 (Uranium)	Wyoming	'69-present (>1000a)	Mining: Large open pit with mill adjacent.	<u>Pre-Mining</u>	29, 54, 65, 66
Highland Mine (Operating)	Converse County Lat 43-05N Lon 105-30W		Reclamation: Unknown.	Topography: Hilly, elev 5200 ft.	
Operator: Exxon	T36N R72W-S17,20,21 28,29 Highland Flats (USGS 15')		<u>Land Use Objectives:</u> Unknown.	Vegetation: Grama-Needlegrass- Wheatgrass. <u>Land Use:</u> Unknown. <u>Current</u> <u>Spoils:</u> Age 0-8 yrs. <u>Reclamation:</u> Unknown. <u>Land Use:</u> Mining.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
TX 47 (Uranium)	Wyoming Crook County	'53-'63 (10a)	Mining: Open pit operation, average depth 98 ft.	Pre-Mining	54, 65
Homestake Nos. 1-4 (Inactive)	Lat 44-30N Lon 104-40W		Reclamation: None.	Topography: Hilly terrain, elev 5000 ft.	
Owner: Homestake Mining	T52N R66W-S26		Land Use Objectives: Unknown.	Vegetation: Wheatgrass-Needlegrass.	
	Moorcroft (USGS 15')			Land Use: Grazing.	
				Current	
				Spoils: Age 13-24 yrs. Most pits water filled.	
				Land Use: Unknown.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 48 (Uranium) Jay Group (Operating) Operator: Federal American Partners	Wyoming Fremont County Lat 42-48N Lon 107-35W T33N R90W-S26 Gas Hills (USGS 7.5')	'57-Present (60a total - 19a pit)	Mining: Deep pit operation, average depth 160 ft. Reclamation: Spoils graded to reduce slope, topsoiled then drill seeded or hydroseeded. Species drilled: thickspike wheatgrass, streambank wheatgrass, western wheatgrass, small burnet, yellow sweetclover. Species hydroseeded: winterfat, desert bitterbrush, antelope bitterbrush. Land Use Objectives: Grazing.	<u>Pre-Mining</u> Topography: Wily terrain, elev 6600 ft. <u>Vegetation</u> : Sagebrush Steppe. <u>Land Use</u> : Grazing. <u>Current</u> Spoils: Age 0-20 yrs. Half of area orphaned, half reclaimed. Reclamation: Seeding on 26.4a completed in May '77. <u>Land Use</u> : Wildlife.	54, 65, 82,

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WV 49 (Uranium)	Wyoming	'55-'71 (80a)	Mining: Open pit operation, dozer-scraper. One pit, 56 ft deep.	<u>Pre-Mining</u>	54, 65, 82, 99
John Gunnel (Inactive)	Fremont County			<u>Topography</u> : Hilly terrain, elev 6600 ft.	
	Lat 42-48N		<u>Reclamation</u> : None.	<u>Vegetation</u> : Sagebrush Steppe.	
	Lon 107-35W		<u>Land Use Objectives</u> : Unknown.	Varied cover of sagebrush, western, bluebunch, and thickspike wheatgrasses.	
Owner: Federal American Partners	T33N R90W-S25,26			<u>Land Use</u> : Grazing.	
	Gas Hills			<u>Current</u>	
	(USGS 7.5')			<u>Spoils</u> : Age 6-22 yrs. Surface dozed into mounds and ridges, some areas very irregular due to dumping of spoils by truck. Slopes vary between 10 and 40°. Well-drained, xeric spoils, gully erosion common. Sandy clay loams.	
				<u>Natural Revegetation</u> : Older spoils '55-'61 have varied cover of sagebrush and rabbitbrush on side slopes. Needleand- thread dominant grass species with lesser components of Indian ricegrass and fringed sagebrush in ground layer; cover <10%.	
				<u>Land Use</u> : Grazing and wildlife.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbances	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 50 (Uranium)	Wyoming	'54-Present (71000a)	Mining: Deep pit operation, average depth 210 ft. Several pits and spoil areas, waste backfilled into pits.	Pre-Mining Topography: Hilly terrain, elev 6600 ft.	54, 65, 84, 99
Lucky Mc Group (includes the next four tables) (Operating)	Fremont County Lat 42-47N Lon 107-30W		Reclamation: Spoils dozed to 3:1 slope, topsoiled and amendments added when available. Prepared areas drill seeded with following mixture:	Vegetation: Sagebrush Steppe. Land Use: Grazing.	
Operator: Lucky Mc Uranium Corporation	T32W R90W T33W R90W Gas Hills (USGS 7.5')		Cristana thickspike wheatgrass, Rosana western wheatgrass, Sodas streambank wheatgrass, small burnet, yellow sweetclover, winterfat, desert bitterbrush.	Current Highly varied, see next four tables for representative areas.	
			Land Use Objectives: Grazing.		

Table 7. (continued)

Mine	Location	Dates and Areas of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 31 (Uranium)	Wyoming	'55-Present (10a)	Mining: Deep pit operation, average depth 230 ft. Waste backfilled into pit, ore stockpiled on area.	Pre-Mining	54, 65, 84, 99
Lucky Mc Group	Prentiss County			Topography: Hilly terrain, elev 6600 ft.	
Dump No. 1	Lat 42-47N				
(Operating)	Lon 107-30W				
Operator:	T13N R90W-S23		Reclamation: None.	Vegetation: Sagebrush Steppe. Sage and rabbitbrush common w/western wheatgrass, and needleandthread.	
Lucky Mc Uranium Corporation	Gas Hills (USGS 7.5')		Land Use Objectives: Unknown.	Land Use: Grazing and wildlife.	
				Current	
				Spoils: Age 0-22 yrs. Oldest spoils abandoned in '62 in a large mesa-like area. Currently, ore stockpiled on top. Side slopes 30°. Well-drained, xeric with gully erosion. Sandy clay and loam soil.	
				Natural Revegetation: Sagebrush and rabbitbrush abundant at base of slopes, cover to 50%. Ground layer varied and composed of foxtail barley, Indian ricegrass, yellow sweetclover, thistle, wheatgrasses, and Sandberg bluegrass.	
				Land Use: Wildlife: antelope common.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 52 (Uranium)	Wyoming	'54-'72	Mining: Deep pit operation, average depth 230 ft. Waste backfilled into pit.	Pre-Mining	54, 65,
Lucky Mc Group (inactive)	Freemont County Lat 42-47N Lon 107-30W	'72-reclaimed	Reclamation: Spoils dosed to max 3:1 slope, topsoiled. Prepared areas drill seeded with mixture as described in WY 50.	Topography: Hilly terrain, elev 6600 ft.	84, 99
Operator: Lucky Mc Uranium Corporation	T33N R90W-S25, 26, 36 Gas Hills (USGS 7.5')		Land Use Objectives: Grazing.	Vegetation: Sagebrush Steppe. 30% shrub cover with Indian ricegrass, needleandthread and western wheatgrass in ground layer.	
				Land Use: Grazing.	
				Current	
				Spoils: Age 5 yrs. Large, mesa-like areas, nearly level. Xeric spoils with slight erosion on side slopes only. Sandy loam soils.	
				Reclamation: Dosed, graded and topsoiled with partially vegetated soil in '72. No seeding, manure added in '77. Scattered invasion of sagebrush and rabbitbrush (1% cover). Uniform and consistent ground layer cover (20%) with good species diversity including Indian ricegrass, needleandthread, June- grass, Sandberg bluegrass, and western wheatgrass. Adjacent areas consist of natural vegetation and unmined areas.	
				Land Use: Idle; antelope common.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WR 53 (Uranium)	Wyoming Fremont County	'66 (80a) '73 (15a reclaimed)	Mining: Deep pit operation, average depth 230 ft. Waste backfilled into pit.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6600 ft. Vegetation: Sagebrush Steppe. Sagebrush with various wheatgrasses, Junegrass, and needleandthread. <u>Land Use: Grazing.</u>	54, 65, 84, 99
Lucky Mc Group Project No. 6 Spoils (Inactive)	Lat 42-07N Lon 107-30W T3N R00W-613.24		Reclamation: Spoils dosed to flat area, drill seeded, no topsoil.		
Operator: Lucky Mc Uranium Corporation	Gas Mills (USGS 7.5')		<u>Land Use Objectives: Unknown.</u>	<u>Current</u> Spoils: Age 4 and 11 yrs. Spoils dosed to form flat mesa-like formation, relatively level. Area well-drained, seric, no erosion. Sandy soil w/gravel and rocks. Reclamation: 15a reclaimed, spoils leveled and crested wheatgrass drill seeded in '73. Currently varied cover (20%) of crested wheat- grass. Natural Revegetation: 65a abandoned, dosed to level area. Natural invasion of rabbitbrush and sagebrush but cover <1%. Ground layer highly varied, <5%, composed of Indian ricegrass, foxtail barley, needleandthread and Hooker sandwort. <u>Land Use: Wildlife, antelope common.</u>	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 54 (Uranium)					
Lucky Mc Group Project 7 Spoils (Inactive)	Wyoming Fremont County Lat 42-47N Lon 107-10W T11N R90E-S25	'55-'73(53a) '73-reclaimed	Mining: Deep pit operation, average depth 230 ft. Waste backfilled into pit. Reclamation: Spoils doped to 1:1 slope, topsoiled. Prepared areas drill seeded with mixture as described for WY 50.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 4600 ft. Vegetation: Sagebrush Steppe. Sage dominant shrub with ground cover of western wheatgrass, Hooker sandwort, needleandthread and Indian ricegrass. <u>Land Use:</u> Grazing and wildlife.	54, #5, #4, 99
Operator: Lucky Mc Uranium Corporation	Gas Hills (USGS 7.5')		<u>Land Use Objectives:</u> Grazing.	<u>Current</u> Spoils: Age 4-22 yrs. Large, relatively flat area, xeric with some wind erosion. Sandy loam soil with areas of wind deposited sand. Reclamation: Area topsoiled in '73, seeded in '74 with crested, pubescent, and western wheatgrasses and yellow clover. Ground layer fairly uniform, 15% cover composed primarily of crested wheat- grass w/other wheatgrasses and Indian ricegrass. Large, uniformly covered area. <u>Land Use:</u> Wildlife, antelope season.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 55 (Uranium)	Wyoming Carbon County	'54-'71 subsurface '71-present (500a+)	Mining: Shaft and solution mining prior to '71. Scraper-doser oper- ation since '71. Max ore depth 420 ft (avg. 350 ft). Ore leached in situ.	<u>Pre-Mining</u> <u>Topography</u> : Hilly, elev 7500 ft. <u>Vegetation</u> : Grass-needlegrass-Wheatgrass. <u>Land Use</u> : Unknown.	47, 65
Lucky Mc Shirley Basin Mines (Operating)	Lat 42-17N Lon 106-12W		Reclamation: Plan unknown; reclamation in progress since '69.	<u>Current</u> <u>Spoils</u> : Age 0-6 yrs. <u>Reclamation</u> : Unknown.	
Operator: Lucky Mc Uranium Corporation	T28N R78W- S20, 21, 28, 29 Moss Agate Reservoir (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	<u>Land Use</u> : Mining.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WV 56 (Uranium)	Wyoming Crook County	'54-'61 (10a)	Mining: Shallow pit operation, average depth 30 ft.	Pre-Mining	54, 65
New Haven Group (Inactive)	Lat 44-45N Lon 104-55W		Reclamation: None.	Topography: Hilly terrain.	
Owner: Homestake Mining	T55N R67W-S10		Land Use Objectives: Unknown.	Vegetation: Wheatgrass-Needlegrass.	
	Oahoto (USGS 15')			Land Use: Grazing.	
				Current	
				Spoils: Age 16-23 yrs.	
				Reclamation: Unknown.	
				Land Use: Unknown.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Source
WV 57 (Uranium)	Wyoming Fremont County	'61-'64 (approx 204 in pit, 70 total) After '64 waste and ore from under- ground operation placed on older spoil.	Mining: Open pit mine from '61-'64; average pit depth 114 ft., max depth 280 ft. Subsequently pit was utilized for access to adits from underground operations. Reclamation: None.	<u>Pre-Mining</u> Topography: Hilly terrain at base of steep mountains, elev 4900 ft. Vegetation: Sagebrush Steppe. Shrub cover of 40% provided by sagebrush and rabbitbrush. Ground layer dominated by blumbunch wheatgrass, western wheat- grass, and Hooker sandwort.	14, 45, 85, 99
Pay Dirt (Inactive)	Lat 42-24N Lon 107-50W				
Owner: Western Nuclear, Inc.	T28N R22W-S20, 21 Jeffrey City (USGS 7.5')		Land Use Objectives: Unknown.	<u>Land Use: Grazing.</u> <u>Current</u> Spoils: Age 13-16 yrs. Extensive level mesa-like configuration with truck-dumped ore stockpiles in some areas. Xeric sandy loam subjected to severe gully erosion on steep outer slopes. Natural Revegetation: Revegetation limited to relatively level areas that have not been subjected to disturbance by the current ore stock- piling and waste dumping operations. Rabbitbrush, sagebrush and fringed sage, accompanied by foxtail barley and Indian ricegrass have invaded small areas where moisture has gathered. <u>Land Use: Area for mine-waste dumping and ore stockpiling.</u>	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WV 56 (Uranium)	Wyoming Carbon County	'76-present (200a- 100a pit, 100a spoils)	Mining: Open cut (pit) mine, ore depth approximately 400 ft; overburden initially removed and placed on dump approx 50 ft high x 1 mi long. Backfilled as pit moves north.	<u>Pre-Mining</u> <u>Topography</u> : Hilly, elev 7000 ft. <u>Vegetation</u> : Grass-wooded-grass-wheatgrass, w/ small sagebrush, sandberg bluegrass, western wheatgrass, and blue grama. <u>Land Use</u> : Sheep grazing, wildlife.	54, 55, 56, 111
Petrochemical Mine (operating)	Lat 43-32N Lon 106-10W		Reclamation: Topsoil to be replaced in contours, slope ≤ 30%, seeding w/native grasses, especially wheatgrass. Yellow sweetclover to be planted to fix nitrogen and stabilize slopes.	<u>Current</u> <u>Spoils</u> : Age 0-1 yr. <u>Reclamation</u> : Mine to date. <u>Land Use</u> : Mining.	
Operator: Petrochemical (Getty Oil Co.)	T28N R79W- E77 Mesa Agate Reservoir (USGS 7.5')		<u>Land Use Objectives</u> : Grazing.		

Table 7. (continued)

Mine	Location	Dates and Areas(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
by 59 (Uranium)	Wyoming Carbon County	'54-'64 (10a)	Mining: (shallow pit operation, average depth 50 ft.	<u>Pre-Mining</u>	54, 65
Poison Basin (Inactive)	Lat 41-02N Lon 107-55W		<u>Reclamation</u> : None.	<u>Topography</u> : Hilly terrain, elev 6600 ft.	
Owner: Uranium and Co.	712M R020-513 712M R020-54		<u>Land Use Objectives</u> : Unknown.	<u>Vegetation</u> : Juniper-Pinyon Woodland.	
	Poison Basin (USGS 7.5')			<u>Land Use</u> : Unknown.	
				<u>Current</u>	
				<u>Spoils</u> : Age 13-23 yrs.	
				<u>Reclamation</u> : Unknown.	
				<u>Land Use</u> : Unknown.	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 60 (Uranium)	Wyoming Fremont County	'64- (15a)	Mining: Shallow pit operation, doser-scraper. After '64, under- ground mine.	Pre-Mining Topography: Hilly terrain, elev 6600 ft.	54, 65, 99
Rex Claims (Inactive)	Lat 42-45N Lon 107-41W		Reclamation: None.	Vegetation: Sagebrush Steppe. Sagebrush with wheatgrasses and needleandthread.	
Operator: Lucky Mc Uranium Corporation	T32N R91W-S11,14 Puddle Springs (USGS 7.5')		Land Use Objectives: Unknown.	Land Use: Grazing and wildlife.	
				<u>Current</u> Spoils: Age 13 yrs. 1 pit with access ramp, 15a spoils dozed to rounded shape, slope 25%. Pit wall recuced. Sandy loam soils, well drained. Pit w/water, gully erosion common. Natural Revegetation: Highly varied vegetation cover, spoil tops w/almost no vegetation. Big sagebrush present at base of slopes. Ground cover includes Indian rice- grass, foxtail barley, needleand- thread, and some Russianthistle. Cover <1%.	
				Land Use: Pit fenced, wildlife. Salamanders in pit.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 61 (Uranium)	Wyoming Fremont County	'55-'67 (30a)	Mining: Open pit mine, maximum pit 190 ft. Reclamation: None. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6700 ft. Vegetation: Sagebrush Steppe. Shrubs with sagebrush dominant, 30% cover. Common ground layer species include bluebunch wheatgrass, junegrass, and Hooker's sandwort. <u>Land Use: Grazing.</u>	54, 65, 99
Rim Group (Inactive)	Lat 42-52N Lon 107-30W			<u>Current</u> Spoils: Age 10-22 yrs. Approx. 10a, in 40 ft deep pits w/ sloping highwalls, remainder dozed mounds with 30° slope. Water in pit. Sand and sandy gravel with rocks; gully erosion present. Natural Revegetation: Sagebrush and rabbitbrush on north-facing slopes, sparse ground layer with wheatgrass, Hooker's sandwort, Indian ricegrass and thistle. Cover highly varied and less than 1%.	
Operator: Lucky Mc Uranium Corporation	T33N R89W-S9 Gas Hills (USGS 7.5')			<u>Land Use: Wildlife and grazing, antelope sighted.</u>	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 62 (Uranium)	Wyoming Fremont County	'55-'73 (177a - 67a in open pits, 110a spoils)	Mining: Combined surface and underground operation. Will be re-mined in a year or so.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6600 ft. Vegetation: Sagebrush Steppe. Mixed grasses, primarily junegrass, needle- anthread. <u>Land Use: Grazing.</u>	54, 65, 82, 99
Sagebrush- Tablestakes Mines (Inactive)	Lat 42-47N Lon 107-38W		Reclamation: None.		
Operator: Federal American Partners	T33N R90W-S32 Gas Hills (USGS 7.5')		<u>Land Use Objectives: Unknown.</u>	<u>Current</u> Spoils: Age 4-22 yrs. Currently spoils are flat-topped mesa-like mounds. Well-drained, xeric spoils with some gully erosion restricted to side slopes. Sandy clay loams. Spoils will be redisturbed within the next two years. Natural Revegetation: Highly varied cover, ranges from 0% to 20% in low drainage areas. Rabbitbrush and fringed sagebrush in drainage areas, low cover of Indian ricegrass, foxtail barley and bottlebrush squirreltail. <u>Land Use: Grazing and wildlife.</u>	

Table 7. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 63 (Uranium) Section 16 mine (inactive)	Wyoming Converse County Lat 43-11N Lon 105-36W	'57-'66 (5a pits, 5a spoils)	Mining: Dozer-scraper operation. 2 deep pits. Max ore depth 160 ft. Reclamation: None. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 5200 ft. Vegetation: Grama-Needlegrass-Wheatgrass. Dominated by blue grama, western wheatgrass, slender wheatgrass, needleandthread. Fringed sage, silver sagebrush, wild bean and fourwing saltbush are occasional shrubs. <u>Land Use:</u> Grazing.	54, 65, 99
Owner (Lease): Kerr McGee Nuclear Corporation	T37N R73W-S16 Highland Flats (USGS 15')			<u>Current</u> Spoils: Age 11-20 yrs. Dored into a few large piles. Tops of spoils slope 0-15°; sides to 30°. Sand, sandstone boulders; well drained and w/wind erosion. Pit fenced. Natural Revegetation: Tops of spoils nearly barren, Indian ricegrass and scurfpea in patches (0-50% cover). A few scattered cottonwoods at base of spoils. Little vegetation in pits, mostly Indian ricegrass on terraces w/ accumulated sand. Highly varied cover. <u>Land Use:</u> Wildlife; antelope sighted.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 64 (Uranium)	Wyoming Fremont County	'54-'70 (approx. 10a) reactivated in '76.	Mining: Open pit mine w/pit depths up to 165 ft and averaging 60 ft. Topsoil has been stockpiled.	<u>Pre-Mining</u> Topography: Hilly terrain at base of steep mountains, elev 7000 ft.	54, 65, 85
Sno-Bell & McIntosh Lease (Operating)	Lat 42-22N Lon 107-40W		Reclamation: Will not commence until pit is closed. Plan will follow state and federal guidelines.	<u>Vegetation</u> : Sagebrush Steppe.	
Operator: Western Nuclear, Inc.	T28N N02W-S27, 32 Crooks Peak (USGS 7.5')		<u>Land Use Objectives</u> : Not determined.	<u>Land Use</u> : Grazing. <u>Current</u> <u>Spoils</u> : Age 0-1, 7-23 yrs. <u>Natural Revegetation</u> : Unknown. <u>Land Use</u> : Mining.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 65 (Uranium)	Wyoming Converse County	'60-'66 (40a- 20a spoils, 20a pit)	Mining: Deep pit in Monument Hill area of Powder River Basin. Max depth 112 ft average 75 ft. Dozer-scraper operation.	Pre-Mining Topography: Hilly terrain, elev 5200 ft. Vegetation: Grama-Needlegrass-Wheatgrass. Dominants of blue grama, needleandthread, western wheatgrass, and slender wheatgrass; sagebrush, snakeweed, fourwing saltbush, and skunkbush occur infrequently.	54, 65, 85, 99
Spook Mine (Inactive)	Lat 43-14W Lon 105-38W		Reclamation: Limited irrigation of trees in depressions.		
Owner: B. Hornbuckle	T38N R73W-S2E Highland Flats (USGS 15')		Land Use Objectives: Unknown.	Land Use: Grazing.	
				Current Spoils: Age 11-17 yrs. Several scattered spoil piles 10-20 ft. Spoils w/ level to sloping tops and side slopes averaging 30°. Pit long and canyon like. Substrate sands and sandstone rocks and boulders; well- drained and wind eroded. High edge/area ratio. Natural Revegetation: Dry areas rather barren w/less than 10% cover; dominants in xeric areas Indian ricegrass and scurf pea. Depressions and pits dominated by slender wheatgrass, Indian ricegrass and curlycup gumweed, cover in these areas frequently >50%. Cottonwood present in some depressions. Disturbed areas where topsoil was not removed or covered have revegetated to pre-mining composition and cover. Land Use: Wildlife: mule deer sighted in pit and antelope on spoils.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WV 66 (Uranium)	Wyoming Carbon County	Current operation	Mining: Open pit operation.	<u>Pre-Mining</u>	48, 54, 65
Sullivan Mine (Operating)	Lat 42-19-06N Lon 106-00-41W	(acreage & dates of disturbance unknown)	<u>Reclamation: Unknown.</u> <u>Land Use Objectives: Unknown.</u>	<u>Topography: Hilly terrain.</u> <u>Vegetation: Grama-Needlegrass- Wheatgrass.</u> <u>Land Use: Unknown.</u>	
Operator: Kerr-McGee Corp.	T27N R78W-S14 Moas Agate (USGS 7.5')			<u>Current</u> <u>Spoils: Age 0-7 yrs.</u> <u>Reclamation: Unknown.</u> <u>Land Use: Unknown.</u>	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WT 67 (Uranium)	Wyoming	'56-'64 (60a)	Mining: Doser-scraper operation. Shallow pit, average depth 40 ft. Maximum 80 ft. Reclamation: None. Land Use Objectives: Unknown.	Pre-Mining Topography: Hilly terrain, elev 8600 ft. Vegetation: Sagebrush Steppe. Land Use: Unknown. Current Spills: Age 13-21 yrs. Natural Revegetation: Unknown. Land Use: Unknown.	54, 65
TJ3N, B59W (Inactive)	Fremont County Lat 42-48N Lon 107-20W				
Owner: Great Basin Petroleum Co.	TJ3N B59W-516 Gas Hills (USGS 7.5')				

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 64 (Uranium)	Wyoming Campbell County	'52-'66 (10a)	Mining: Numerous small shallow pits. Reclamation: None.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 5500 ft. Vegetation: Grama-Needlegrass- Wheatgrass. <u>Land Use: Unknown.</u>	54, 65
T43W, R75W (Inactive)	Lat 43-45N Lon 105-58W		<u>Land Use Objectives: None.</u>	 <u>Current</u> Spoils: Age 11-25 yrs. <u>Natural Revegetation: Unknown.</u> <u>Land Use: Unknown.</u>	
Owner: Unknown	T43N R75W-32E North Butte (USGS 7.5')				

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 69 (Uranium) Union Carbide Mines Eastern Gas Mills (Includes Fey Alloy and Pit Groups)	Wyoming Natrona County Lot 42-47-40W Lon 107-29-05W	'55-Present (400a)	Mining: Open pit operation. Dozer-scraper with pits about 150 ft in depth. Old pits backfilled with spoils from new pits.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 7000 ft. Vegetation: Sagebrush Steppe.	48, 54, 65, 83, 99
(Operating)	T31N R89W		Reclamation: Spoils dozed, rough graded and drained. Maximum slope 3:1. When possible topsoil added, otherwise mulched, harrowed or fertilized. Prepared areas seeded with following: wildrye, mutton bluegrass, steambank wheatgrass, bluebunch wheatgrass, Indian ricegrass, fourwing saltbush, black sage, Utah snowberry.	<u>Land Use: Grazing.</u> Current Spoils: Age 0-22 yrs. Oldest undisturbed spoils, '63. Extensive flat topped spoils, well drained. Some areas graded and ready for topsoiling. Reclamation: Spoil areas graded and ready for topsoiling, no seeding to date. Natural Revegetation: Low cover (c1%) of Hooker sandwort, Fendler sandwort, Indian ricegrass, bearded bluebunch wheatgrass, foxtail barley, Sandberg bluegrass in mesic areas.	
Operator: Union Carbide Corporation	Erway Basin SW Gas Mills (USGS 7.5')		<u>Land Use Objectives: Unknown.</u>	<u>Land Use: Grazing and wildlife; antelope sighted.</u>	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 70 (Uranium)	Wyoming Fremont County	'55-Present (800a)	Mining: Open pit operation with pits 165-225 ft deep. Old pits backfilled with spoils from new pits.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 7000 ft. Vegetation: Sagebrush Steppe. Land Use: Grazing. <u>Current</u> Spoils: Age 0-22 yrs. Oldest undisturbed spoils, 1968. Extensive flat-topped spoils, well drained. Some areas graded and ready for topsoiling. Reclamation: Portions of spoils graded and ready for topsoiling, no seeding to date. Natural Revegetation: Low and varied cover. On '68 spoils, Indian ricegrass dominant at spoil bases. '75 spoils essentially barren. Land Use: Grazing and wildlife, antelope common.	48, 54, 65, 83, 99
Union Carbide Mines Western Gas Hills (includes the Dick, Joy and Ola groups)	Lat 42-47-40N Lon 107-29-20W T3H 890W		Reclamation: Spoil dozed, rough graded and drained. Maximum slope 3:1. When possible topsoil added, otherwise mulched, harrowed or fertilized. Prepared areas seeded with same mixture as Eastern Gas Hills. Land Use Objectives: Unknown.		
(Operating)	Gas Hills (USGS 7.5')				
Operator: Union Carbide Corporation					

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 71 (Uranium)	Wyoming	'57-'62 (12a in pit, 72a total)	<u>Mining</u> : Deep pit in Gas Hills sandstone. Maximum pit depth 175 ft, average 90 ft. Dozer- scraper operation.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6900 ft.	54, 65, 82, 99
Vaca Pit (Inactive)	Lat 42-48N Lon 107-30W		<u>Reclamation</u> : None.	<u>Vegetation</u> : Sagebrush Steppe. Shrubs included big sagebrush, black sage, and fringed sage. Common ground layer components were bluebunch wheatgrass, western wheatgrass, june- grass, and Hooker's sandwort.	
Owner: Federal American Partners	T33N 809W S21, 22 Gas Hills (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	<u>Land Use</u> : Grazing.	
				<u>Current</u> Spoils: Age 15-20 yrs. Pit w/alonging high walls and w/ water. Flat-topped area 15-30 ft high w/ side slopes up to 40°. Sandy clay loams w/ gravel, rocks, and boulders. Natural <u>Revegetation</u> : Sagebrush and rabbit- brush provide uniform cover (up to 50%); common ground layer species were Hooker's sandwort and thistle. <u>Land Use</u> : Grazing and wildlifer antelope and deer observed.	

Table 7. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WY 72 (Uranium)	Wyoming Carbon County	'70-present (50a- 20a pit, 30a spill)	Mining: Doser-scraper operation. Deep pit w/ maximum ore depth of 235 ft; average 175 ft.	<u>Pre-Mining</u>	54, 65, 111
Walter Lease (Operating)	Lat 42-19N Len 106-8W		Reclamation: Back filling as ore extracted.	<u>Topography</u> : Hilly, elev 3000 ft. <u>Vegetation</u> : Grass-Needlegrass-Wheatgrass. <u>Land Use</u> : Unknown.	
Operator: Mullen, Inc.	T27N S76W- S11,14		<u>Land Use Objectives</u> : Unknown.	<u>Current</u>	
	Moos Agate Reservoir (USGS 7.5')			<u>Soils</u> : Age 4-7 years. <u>Reclamation</u> : Mine completed. <u>Natural Vegetation</u> : Unknown.	
				<u>Land Use</u> : Mining.	

Table 7. (continued)

Mine	Location	Dates and Areas(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WP 73 (Phosphate)	Wyoming Lincoln County	'50-present (1950-'55 - 300a '55-present - 400a)	Mining: Contour mining of bedded phosphorite overlain by limestone. Overburden is backfilled into mined areas as mining progresses.	<u>Pre-Mining</u> Topography: Rolling terrain, elev 4300 ft. Vegetation: Sagebrush-Steppe. Sagebrush and grasses w/service- berry and chokeberry in drain- age paths. <u>Land Use:</u> Unknown.	34, 147, 148
Leele Mine (Operating)	Lat 41-43N Lon 111-30W		<u>Reclamation:</u> Early reclamation (early 70's) consisted of rounding spoil dumps and seeding w/big sagebrush, thickspike wheatgrass, western wheatgrass, green needlegrass, Indian ricegrass, and created wheatgrass. Recent reclamation has included recontouring of backfilled spoils, topsoiling, and seeding w/created wheatgrass.	<u>Current</u> Spoils: Age 0-27 yrs. Older ungraded spoils are series of bench-shaped mounds. Some spoil piles have been rounded and others are backfilled and graded to original contour. <u>Reclamation:</u> Early reclamation has not done well; areas are barren. Later reclamation has resulted in a good cover of created wheatgrass.	
Operator: Stauffer Chemical Co.	T218 R120W-03, 2.10.15 T228 R120W-02S, 35 Leele (USGS 7.5')		<u>Land Use Objectives:</u> Unknown.	<u>Natural Reclamation:</u> Old spoils have approx. 50% cover by big sagebrush and 50% cover by local grasses. <u>Land Use:</u> Idle.	

TABLE 8
INTERMOUNTAIN REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR PHOSTATE PRIOR TO 1976 IN IDAHO

Table 8.

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 1	Idaho	'52-'69 (604a)	Mining: Dozer-scraper-truck operation. Two main pits to 200 ft deep and several small pits. Overburden dumped around and between pits. Highwall not reduced.	Pre-Mining Topography: Rolling foothills, elev 6500-6800 ft.	48, 54, 99, 142, 143, 153
Ballard (Inactive)	Caribou County Lat 42-45N Lon 111-30W	of which: (191a pits, 317a dumps, 96a service) '69-'73 (352a reclaimed)	Reclamation: Has proceeded off and on since '69. Some backfilling, grading, and benching; no topsoiling. Numerous tests plots by U.S. Forest Service of trees, grasses and shrubs. Some areas were serially seeded; steep slopes were hydroseeded using various mixtures of grasses and legumes. A few acres per year are still being reclaimed.	Vegetation: Sagebrush Steppe w/ big sagebrush, bitterbrush, and dense stands of native grasses. North slopes w/aspen and shrubs such as chokecherry, serviceberry, mountain maple. Some Douglas fir.	
Owner: Monsanto Chemical Co.	T7S R42E-S12,13 T7S R43E-S6,7,18 Lower Valley (USGS 7.5')			Land Use: Grazing and big game winter range.	
	Henry (USGS 15')		Land Use Objectives: Grazing.	Current Spoils: Age 0-25 yrs. Rolling spoil dumps and two long pits w/ highwalls as high as 200 ft. Substrate mostly waste shales that break down to a fine texture. Highwall slumped in some areas and steep shale slopes are eroding into pits. Several springs.	
				Reclamation: 7-year old plantings of ponderosa pine, lodgepole pine, elm, bitter- brush, and other shrubs are vigorous. Dense herbaceous stands of brome, timothy, wheatgrasses, alfalfa, and sweetclover occupy moderate slopes on dumps. Steep slopes have 50% cover of these same species w/highest densities in gullies. Occasional revegetation of steep pit walls and pit floor, probably volunteer.	
				Land Use: Fallow, wildlife. Winter use by deer, crossed by elk and moose, cliff swallows nesting in highwall.	

Table 8. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 2 (Phosphate)	Idaho	'20-'57	Mining: Properties include 13 miles of outcrop. Through 1977 have mined 27 pits in 3 major areas, including 4 miles along the ridge. 3 active pits, but many scheduled for re-mining. Overburden of up to 200 ft is stripped w/scrappers and ore is loaded w/shovels and slurried to plant. Topsoil and favorable strata segregated.	<u>Pre-Mining</u> Topography: Mountain slopes and foothills, elev 6100-7500 ft. Vegetation: Sagebrush-Steppe. Big sagebrush, bitterbrush, rabbit-brush, serviceberry, and native grasses. North slopes w/aspen stands and Douglas fir/western white pine stands. Land Use: Grazing, wildlife (big game migration), small area of grain farming. <u>Current</u> Spoils: Age 0-20 yrs. Long narrow pits and spoil dumps oriented along the ridge and interspersed w/undisturbed strips. Spoil dumps often steep (to 37°) due to available terrain. Loams w/gravel on dumps and some older dumps of shale w/fines beneath. Rill and gully erosion on steeper dumps, partially controlled by terracing.	54, 56, 99, 142, 143, 145
Conda Mine (Operating)	Caribou County Lat 42-40-10N Lon 111-30W	'57 - present (938a total)			
Operator: J. R. Simplot Co.	T8S R42E-S2, 10,11,12,14,15, 22,23,24,25,26, 27	'68 - present (152a reclaimed)	Reclamation: '66-'68, aerial seeding of grasses, bitterbrush, and other shrubs. '68 - present, backfill some areas, grade, topsoil where available or place favorable strata on surface, fertilize, and broadcast seed sweetclover, alfalfa, timothy, orchardgrass, intermediate wheatgrass, and other grasses. Plant a variety of shrubs and trees including chokecherry, caragana, Russian olive, honeysuckle, lodgepole pine, and scotch pine. Steep original slopes force reclaimed slopes as great as 37°. Lime-stone highwalls currently not being reduced but extensive lengths do not occur. Sediment basins for silt. Small area of grain farming will be returned. Many experimental plots including steep slope reclamation.		
	Soda Springs (USGS 15')		Land-Use Objectives: Grazing and wildlife.	Reclamation: '66-'68 aerial seeding - extensive stands of bitterbrush, big sagebrush, ceanothus, rabbitbrush, sweet-clover, and grasses w/scattered aspen and willows. '68-present - dense stands of alfalfa and sweetclover w/grasses intermixed. Big sagebrush is invading perimeters. Grasses gaining prominence on older areas. Shrubs and trees fairly successful.	

Table 8. (continued)

Mine	Location	Dates and Years of Disturbance	Mining and Reclamation Plans	Pre-mining and Current Conditions	Information Sources
ID 2 (continued)				Natural Revegetation: 16-18 year old dumps densely colonized w/big sagebrush, bitterbrush, aspen, chokecherry, sweetclover, and grasses. Numerous such areas scattered through the mine are not included in reclamation acreage. Land Use: Grazing and wildlife. Extensive deer usage and occasional elk and moose usage for migration and winter range. Many aspen stands interspersed between pits provide cover and high edge/area ratio.	

Table 8. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 3 (Phosphate)	Idaho	'60-'61 (70a)	Mining: Contour mining of phosphorite outcroppings. High grade ore excavated by front-end loaders. Approx 100,000 tons mined.	<u>Pre-Mining</u>	54, 56, 143, 147, 148
Diamond Gulch Mine (Inactive)	Caribou County Lat 42-37N Lon 111-28W			Topography: Hilly terrain, elev 7000 ft.	
Owner: Staufer Chemical Co.	T98 R43E-S28,33		Reclamation: Spoils seeded by U.S. Forest Service w/native grasses in '60's.	Vegetation: Douglas Fir Forest and Sagebrush Steppes.	
	Fossil Canyon (USGS 7.5')		<u>Land-Use Objectives:</u> Unknown.	<u>Land Use:</u> Unknown.	
				<u>Current</u>	
				Spoils: Age 16-17 yrs. Long cuts paralleling contours w/spoils cast downhill.	
				Reclamation: Slopes stabilized by vegetation.	
				<u>Natural Revegetation:</u> Unknown.	
				<u>Land Use:</u> Unknown.	

Table 8. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 4 (Phosphate)	Idaho	'46 - present (1349a total, 434a pits, 559a dumps, 356a roads)	Mining: Topsoil, overburden, and waste shale selectively removed by dozer- scraper. Furnace and fertilizer grade beds selectively removed by shovel- truck to depth of 100 ft. Low grade ores stockpiled for possible later milling. Pits backfilled by shovel- truck. Many NW-SE oriented pits.	<u>Pre-Mining</u> Topography: Rolling foothills, elev 5600-6000 ft. Vegetation: Sagebrush-Steppe. w/ big sagebrush, rabbitbrush, and dense stands of native grasses. Moist slopes and valleys w/ aspen and shrubs, including chokecherry, service- berry, mountain ash, and maples.	54, 56, 99, 142, 143, 146
Gay Mine (Operating)	Lat 43-05N Lon 112-10W	'64 - present (462a reclaimed, 225a graded and topsoiled)	Reclamation: '64-'75, grade to natural rolling contour, topsoil, disk, fertilizer and drill created wheatgrass. '76 on, increase to a mixture of four wheatgrasses, Experi- alfalfa, yellow sweetclover. Experi- mental plots of many grasses, forbs, and shrubs. Currently reclaiming more area than mining and will reclaim all areas. Aspen and shrub stands are left for wildlife whenever possible.	<u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age 0-31yrs, most 0-10 yrs. Active pits are 300 ft deep in soft mudstones and shales. Backfilled pits have rolling natural contour and surface of loam topsoils w/ minimal erosion.	
Operator: J. R. Simplot Co.	T4S R37E-S2, 3,11,14,15,21, 22,23,26,27,28 T4S R38E-S19, 29,30,31,32 T5S R38E-S5 Vandell Springs (USGS 15')		<u>Land-Use Objectives:</u> Grazing and wildlife.	<u>Reclamation:</u> Dense stands of created wheatgrass occupy all reclaimed areas, which are more productive than pre-mining due to fertilization. Older areas being invaded by rabbit- brush and big sagebrush. Aspen stands often left undis- turbed. Natural Revegetation: Graded spoils and dumps are rapidly occupied by heavy stands of big sagebrush, rabbitbrush, june- grasses, crested wheatgrass, and Russian thistle. Some also w/ considerable chokecherry, sorbos, and serviceberry. Some of these areas will be left.	

Table 8. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 4 (continued)				Land Use: Grazing, wildlife and hunting. Cattle and big game are attracted to fertilized grasses. Many deer heavily browse aspen and shrub stands. Deer, elk, and occasional moose migrate through mine. Golden and bald eagles nest and winter in aspen. Waterfowl heavily use ponds for nesting and migratory resting.	

Table 3. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 5 (Phosphate)	Idaho	'58-'61 (400a)	Mining: Scraper-shovel operation. Contour pit follows outcrop along ridge. Mined to depth of 150 ft, pit length 7500 ft. Spoils dumped on downhill side. Processing plant in valley.	Pre-Mining Topography: Steep mountain side, elev 8000 ft. Vegetation: Douglas Fir Forest. W/subalpine fir and aspen.	48, 54, 56, 99, 142, 143, 144
Georgetown Canyon (Inactive)	Caribou County Lat 42-30N Lon 111-10W	'58-'61 (400a) Projected additional mining	Reclamation: None. Will be prepared for re-mining. Land-Use Objectives: None.		
Owner: Baker Industries	T108 M45E-6S, 7, 8, 10, 11, 13, 16 Secedrift Mc. (USGS 7.5')			Spoils: Age 16-19 yrs. Limestone highwall avg. 60 ft high and 7500 ft long. Spoil dumps level on top and 45° slope to outside. Gravelly silt and clays w/shale. Active fill and gully erosion on slopes. Sediment basins below waste dumps. Reclamation: Mine had apparently been seeded. Tops of dumps w/ 10-20% cover of yellow sweet-clover, alfalfa, wheatgrasses, smooth brome, and weedy forbs. Scattered clumps of snowbrush, ceanothus, mountain-ash, other shrubs, and aspen. Slopes w/similar species but cover varied depending on slope position. Willows in some gullies. Land Use: Grazing, wildlife. Elk, deer, and moose move through the area.	

Table 8. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 6 (Phosphate)	Idaho	'69-present (550a)	Mining: Dozer-scraper-truck operation. Mining will eventually include 5 miles of outcrop. Most wastes are dumped, backfilling minimal due to future re-mining potential. Pits 300-400 ft deep, highwall not reduced.	<u>Pre-Mining</u> Topography: Rolling foothills, elev 6800-7000 ft. Vegetation: Sagebrush Steppe w/big sagebrush, bitterbrush, and dense stands of native grasses. Upper elevations w/Douglas fir, aspen, and shrubs such as chokecherry, serviceberry, and mountain maple.	48, 54, 99, 142, 143, 153
Henry (Operating)	Caribou County Lat 42-50M Lon 111-30M	of which: 175a pits, 342a dumps, 33a service) Reclaimed (166a)	Reclamation: Dumps terraced, benched, and rounded. Topsoiled if available or covered w/waste shales and mud- stone. Seeded w/smooth brome, timothy, wheatgrasses, alfalfa, and sweetclovers. Fertilize on some areas.	<u>Land Use:</u> Grazing and big game winter range.	
Operator: Monsanto Chemical Co.	T68 R42E-S13,14,24 T68 R43E-S19,29,30, 31,32 Henry, Lanes Creek (USGS 15')	10-15 more yrs of mining projected	For wildlife leave aspen strips between pit and dumps, and leave gasc crossings every few thousand feet along the highwall. <u>Land Use Objectives:</u> Grazing and wildlife.	<u>Current</u> Spoils: Age 0-8 yrs. Rolling spoil dumps w/some gully erosion, Slopes moderate. Surfaced w/waste shales that break down to fine texture. High- wall and pit active. Reclamation: Dense stands (50-100% cover) of alfalfa, sweetclover, and grasses on reclamation areas. Fertilized areas superior. Most stands dominated heavily by alfalfa. Bitterbrush plantings on terraces suppressed by heavy browsing.	
				<u>Land Use:</u> Some livestock grazing and heavy migratory and winter use by deer, elk, and moose. Deer faen in aspen stands within mine.	

Table 8. (continued)

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 7 (Phosphate)	Idaho	'64-'66,	Mining: Doser-scraper, shovel-truck operation. Five miles of outcrop being mined along ridgetop. Two main pits at north end split by canyon. Pits 300-400 ft deep. Waste currently dumped outside pits but will be backfilled. Older dumps may not be backfilled. Area left unmined as a big game corridor.	Pre-Mining Topography: Steep ridge side and top, elev 7200 ft.	42, 54, 56, 99, 142, 143, 144
Maybe Canyon (Operating)	Caribou, County Lat 42-40N Lon 111-20W	'71 - present (300a)			
Operator: Baker Industries	T7S R44E-S33, 34 T8S R44E-S3,4, 10,15 Dry Valley (USGS 7.5')	'67 (70a reclaimed) '74 - present (190a reclaimed)	Reclamation: '65-'67 - erosion control structures. Waste dumps benched and seeded w/grasses and shrubs. '74-present - backfill where possible, reduce slope on dumps, stockpile waste shales (favorable growth media) and return to surface, backfill highwall. Fertilize and drill seed w/wheatgrasses, timothy, orchardgrass, brome, alfalfa, sweetclover, others.	Vegetation: Douglas Fir Forest and Sagebrush Steppe. W/aspens, rabbitbrush, serviceberry, mountain maple, and native grasses. Land Use: Grazing, forestry, wildlife.	
				Current Spoils: Age 0-3 yrs. and 11-13 yrs. '65-'67 spoils - dumps w/40° slopes w/benches, tops level, gully erosion. '74-present spoils - slopes to 30°, surface of shale w/silts and clays beneath, minor gully erosion.	
				Reclamation: '65-'67 spoils - level tops w/10-50° cover of legumes and grasses. Benched slopes w/little ground layer and some shrubs. '74-present spoils - 75% cover dominated by wheatgrasses w/some other grasses and legumes, vigorous stand.	
				Land Use: Sheep grazing. Deer, elk, and moose use mine and travel through. An area was left unmined as game corridor across highwall.	

Table 8. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 8 (Phosphate)	Idaho	'68-'70 (13a)	Mining: Scraper, truck-shovel operation. Shallow pit along ridge, spoils dumped downslope. Will be re-mined.	<u>Pre-Mining</u> Topography: Rolling foothills, elev 6500 ft.	54, 99, 144
Mountain Fuel (Inactive)	Lat 42-32N Lon 111-20W		Reclamation: Apparently some grasses were seeded.	Vegetation: Douglas Fir Forest w/extensive areas of aspen, native shrubs and grasses.	
Owner: Baker Industries	T9S R44E-S14		<u>Land-Use Objectives:</u> Grazing.	<u>Land Use:</u> Grazing, forestry.	
	Dry Valley (USGS 7.5')			<u>Current</u> Spoils: Age 7-9 yrs. Highwall generally reduced, spoil dump slopes 10-40°, avg. 20°. Gravelly loam w/some shale piles. Some gully and rill erosion.	
				<u>Reclamation/Natural Revegetation:</u> Extensive reestablishment of aspen, willows, Douglas fir, choke-cherry, and ceanothus form up to 75% cover. Grass stands of 25-100% cover are heavily grazed and contain Russian thistle and other weedy forbs.	
				<u>Land Use:</u> Grazing, wildlife.	

Table 8. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
ID 9 (Phosphate)	Idaho Bear Lake County	'45-'47 '52-'60 (212a)	<u>Mining</u> : Underground '07-'29, Contour mining after '45. <u>Reclamation</u> : Idaho Fish and Game Department plans to rehabilitate spoils. <u>Land-Use Objectives</u> : Wildlife habitat, particularly deer winter range.	<u>Pre-Mining</u> <u>Topography</u> : Hilly terrain, elev 7000 ft. <u>Vegetation</u> : Douglas Fir Forest and Sagebrush Steppe. <u>Land Use</u> : Unknown. <u>Current</u> <u>Spoils</u> : Age 17-25, 30-32 yrs. Long cut w/spoils east downhill High edge/area ratio. Gully erosion common. <u>Reclamation</u> : No reclamation conducted to date. <u>Natural Revegetation</u> : Vegetation sparse. <u>Land Use</u> : Wildlife habitat.	54, 56, 143, 147, 148

Table 2. (continued)

Mine	Location	Date and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
Idaho					
Idaho (Phosphate)					
Woolly Valley Mine	Caribou County	'67 - present '67-'76 (288a)	Mining: Contour mining of 5 m of phosphorite outcrop. Overburden stripped by dozers and scrapers; ore removed by shovels and trucks. Topsoil stockpiled.	Pre-Mining Topography: Steep ridge side slopes 40-60°, elev 7000 ft.	54, 143, 147, 148
Blackfoot (Narrow Mine) (Operating)	Let 42-488 Lon 111-21N				
Operator: Stauffer Chemical Co.	77S 843E- 813,14		Reclamation: Reclamation conducted from '69-'73 consisted of broadcast seeding grasses and legumes including pubescent wheatgrass, smooth brome, timothy, alfalfa, and yellow sweet-clover. Reclamation from '73 to present includes replacement of spoils in cut, topsoiling and seeding w/grasses and native shrubs.	Vegetation: Douglas Fir Forest and Sagebrush Steppe. Land Use: Unknown.	
	Lower Valley (USGS 7,3')			Current Spoils: Age 0-10 yrs. Older spoils ('60-'73) are benchlike features downhill from mining cut. Newer spoils ('73-present) have near natural topography w/topsoil surface substrate.	
			Land Use Objectives: Unknown.	Reclamation: Dense stands of grass are reported at this site.	
				Land Use: Unknown.	

TABLE 9
INTERMOUNTAIN REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR PHOSPHATE PRIOR TO 1976 IN UTAH

Table 9.

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
UT 1 (Phosphate) Bradley Properties (Inactive)	Utah Rich County Lat 41-39N Lon 111-7W	'72-'73 (approx 50a)	Mining: Open pit. Reclamation: None. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Mountainous, elev 7800 ft. <u>Vegetation</u> : Douglas Fir Forest. <u>Land Use</u> : Grazing.	54, 147, 150
Owner: Bradley Estates Inc.	T11N R8E-S36 Rex Peak (USGS 7.5')			<u>Current</u> Soils: Age 4-5 yrs. Spoil material sandstone and shales; fine material. Natural Revegetation: Grasses and trees invading. <u>Land Use</u> : Grazing.	

Table 9. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
UT 2 (Phosphate)	Utah	'73-'76 (100a)	Mining: Truck and shovel operation mining phosphorite outcrop on ridge. Some spoil wasted off of ridge; most spoil backfilled as mined.	<u>Pre-Mining</u> Topography: Mountainous, elev 7000 ft.	54, 147
FMC Properties (Inactive)	Lat 41-39N Lon 111-7W		Reclamation: Spoils backfilled in most cases, high walls blasted to reduce slope. Site seeded in fall '76 w/crested wheatgrass, intermediate wheatgrass, Russian wildrye and perennial ryegrass.	<u>Vegetation</u> : Douglas Fir Forest. <u>Land Use</u> : Grazing. <u>Current</u>	
Owner: Food Machinery Chemical Corp.	T11N N7E-S25, 36 T11N R8E-S17, 18, 19, 20, 30, 31 Rex Peak (USGS 7.5')		<u>Land Use Objectives</u> : Unknown.	<u>Spoils</u> : Age 1-4 yrs. Spoil materials sandstone and shales from course to fine tex- ture. Backfilled areas are near-natural contour, other areas w/up to 15 ft unreduced highwall. <u>Reclamation</u> : Sparse vegetative cover. <u>Land Use</u> : Idle.	

Table 9. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
UT 3 (Phosphate) Rex Peak - Brazier Canyon Properties (Inactive)	Utah Rich County Lat 41-39N Lon 111-7W T11N R8E	'74-'75 (approx 300a)	Mining: Contour mining of phosphorite outcropping from Rex Peak for 5 mi NNE. Spoils backfilled. Reclamation: Spoils backfilled and graded to near original contour and hand seeded in '75 w/crested wheat- grass. Land-Use Objectives: Grazing.	<u>Pre-Mining</u> Topography: Mountainous, elev 6600-7800 ft. Vegetation: Douglas Fir Forest and Sagebrush-Steppe. <u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age 2-3 yrs. Spoils are sandstone, shale w/rough and fine texture material present. Spoils have been graded to near-original contour. Reclamation: Seeding has resulted in a dense stand of crested wheatgrass. <u>Land Use:</u> Unknown.	54, 147

Table 9. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
UT 4 (Phosphate) Vernal Mine (Operating) Operator: Stauffer Chemical Co.	Utah Uintah County Lat 40-37N Lon 109-29W T2S R21E-S36 T2S R22E-S28, 29, 30, 31 Steinaker and Donkey Flat (USGS 7.5')	'60-present (approx 250a)	Mining: Contour mining of bedded phosphorite overlain by approx 50 ft of limestone. Overburden is backfilled into mined-out areas as mining progresses. Reclamation: Reclamation has been conducted since '72 and started w/the oldest spoils. Backfilled spoil is graded and seeded w/crested wheatgrass, pubescent wheatgrass, and intermediate wheatgrass. The local SCS office is planning a new species mixture. Approx 125a treated to date. Land Use Objectives: Grazing.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 6200 ft. Vegetation: Juniper-Pinyon Woodland. <u>Land Use:</u> Grazing. <u>Current</u> Spoils: Age 0-17 yrs. Broken limestone graded to approx 12' Reclamation: Grass stands are dominated by crested wheatgrass w/small amounts of intermediate wheatgrass, pubescent wheatgrass, and Russian thistle. <u>Land Use:</u> Idle.	54, 56, 147, 151

TABLE 10
FAR WESTERN REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR URANIUM PRIOR TO 1976 IN OREGON

Table 10.

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
OR 1 (Uranium)	Oregon	'59-'64	Mining: Several shallow pits; average 20 ft deep. Mine operated underground '55-'59. Pits will be drained in '78.	Pre-Mining	54, 65, 106, 107, 108
White King (Inactive)	Lake County Lat 42-20N Lon 120-33W	(approx 15-20a) Scheduled for re-opening	Reclamation: Plan undeveloped. Land Use Objectives: Grazing.	Topography: Hilly terrain, elev 6200 ft. Vegetation: Ponderosa Shrub Forest and Sagebrush Steppe. Land Use: Grazing.	
Operator: Western Nuclear, Inc.	T37S R18E-S25 T37S R19E-S30 Cox Flat (USGS 7.5')			<u>Current</u> Spoils: Age 13-18 yrs. Spoils are irregularly-shaped mounds of tephritic sandstone placed above pits. Pits are flooded w/water containing arsenides and sulfides. Natural Revegetation: Spoil piles w/estimated 10% cover by ponderosa pine. Land Use: Grazing.	

TABLE 11
FAR WESTERN REGION
DESCRIPTIONS OF SITES EXCEEDING 10 ACRES IN SIZE MINED
FOR COAL AND URANIUM PRIOR TO 1976 IN WASHINGTON

Table 11.

Mine	Location	Dates and Acres (a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
MA 1 (Coal)	Washington Lewis & Thurston Counties	'71-present (2280a)	Mining: Large area mine w/two main pits. North field: dragline-bucket wheel excavation-conveyor-stacker system. South field: truck-shovel. 300 ft of overburden is backfilled w/dragline. No valley bottom min- ing because of high precipitation.	Pre-Mining Topography: Coast Range-rolling upland w/steep-sided valleys, elev 700 ft.	54, 95, 154, 155
Operator: Washington Irrigation & Development Co.	Lat 46-44N Lon 122-47W T14N R1W-S4, 5, 9, 10 T15N R1W-S13, 16, 19, 24, 29, 31, 32 Bucoda (USGS 7.5') Centralia (USGS 15')	'73-present (407a reclaimed)	Reclamation: Backfill and grade to approximate original contour. Topsoil and favorable strata segre- gated and placed on spoils. Drill annual ryes and native grasses or wheat. Fertilize twice annually. Follow w/rotation of grass-grains- legumes, or sequence of legumes- red alder-red alder/Douglas fir- Douglas fir. Water quality of prime concern due to 48-inch annual precipitation. Series of settling ponds, contour terraces, and water- ways w/some chemical treatment. Temporary disturbances stabilized w/grasses.	Vegetation: Cedar-Hemlock-Douglas Fir Forest. Dominated by Douglas fir w/red alder in valleys. Land Use: Forestry, grazing, agriculture. Current Spoils: Age 0-6 yrs. Rolling topography w/clay loam soils. Erosion minimal due to conservation prac- tices. Most of mine is in various stages of mining or grading. Reclamation: Cereal grain crops and dense stands of grasses occupy reclaimed areas. Margins of settling ponds have dense stands of cattails and grasses. Much of the reclaimed areas were in stubble when visited. Land Use: Cereal grains, certified seed, hay, wildlife, hunting. Heavy waterfowl nesting and resting use of ponds. Black- tailed deer common.	

Table 11. (continued)

Mine	Location	Date and Area(s) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WA 2 (Uranium)	Washington Stevens County	1955-present (approx. 200- 300a)	Mining: Several pits averaging 100 ft; max 420 ft. Doser-scraper operation. Older pits backfilled recently.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 2700-3400 ft.	34, 65, 142, 149
Midnite-Boyd Lease (Operating)	Lat 47-56N Lon 118-7W		Reclamation: Pits are backfilled, spoils recontoured and aged for several years, and seeded w/grasses.	Vegetation: Western Ponderosa Forest.	
Operator: Deen Mining Co.	T28W R37E-61.12		<u>Land Use Objectives:</u> Unknown.	<u>Land Use:</u> Unknown.	
	Turtle Lake (USGS 15')			<u>Current</u> Spoils: Age 0-22 yrs. Rocky substrate.	
				<u>Reclamation:</u> None to date.	
				<u>Natural Revegetation:</u> Sparse invasion of ponderosa pine.	
				<u>Land Use:</u> Mining.	

Table 11. (continued)

Mine	Location	Dates and Acres(a) of Disturbance	Mining and Reclamation Plans	Pre-Mining and Current Conditions	Information Sources
WA 3 (Uranium)	Washington Stevens County	'58-'62, '77 (approx 15-20a)	Mining: Pit mined by dozer-scraper operation; average ore depth 256 ft. Reclamation: Under development. Land Use Objectives: Unknown.	<u>Pre-Mining</u> Topography: Hilly terrain, elev 2000- 2200 ft. Vegetation: Western Ponderosa Forest. <u>Land Use:</u> Unknown.	54, 65
Sherwood Mine (Operating)	Lat 47-53N Lon 118-7W			<u>Current</u> Spoils: Age 15-19 yrs. <u>Natural Revegetation:</u> Unknown. <u>Land Use:</u> Mining.	
Operator: Western Nuclear, Inc.	T28N R37E-S34, 35 Turtle Lake (USGS 15')				

III. DISCUSSION OF MINES BY REGION AND STATE

The following discussions address general information from inventoried mines by state and region. The states are discussed under the following geographical regions because of general similarity of ecological conditions: Southwestern Region, Northern Great Plains Region, Intermountain Region, and Far Western Region. A total of 231 mines were inventoried; approximately one third of these are currently operating. The majority of inventoried mines are located in grassland ecosystems of the Northern Great Plains Region (see Figure 1). Approximately 41000 acres have been disturbed by the inventoried surface mines in this region, compared to approximately 61000 acres disturbed over the 13-state area covered by this atlas (disturbance includes pits and spoils only).

A. SOUTHWESTERN REGION

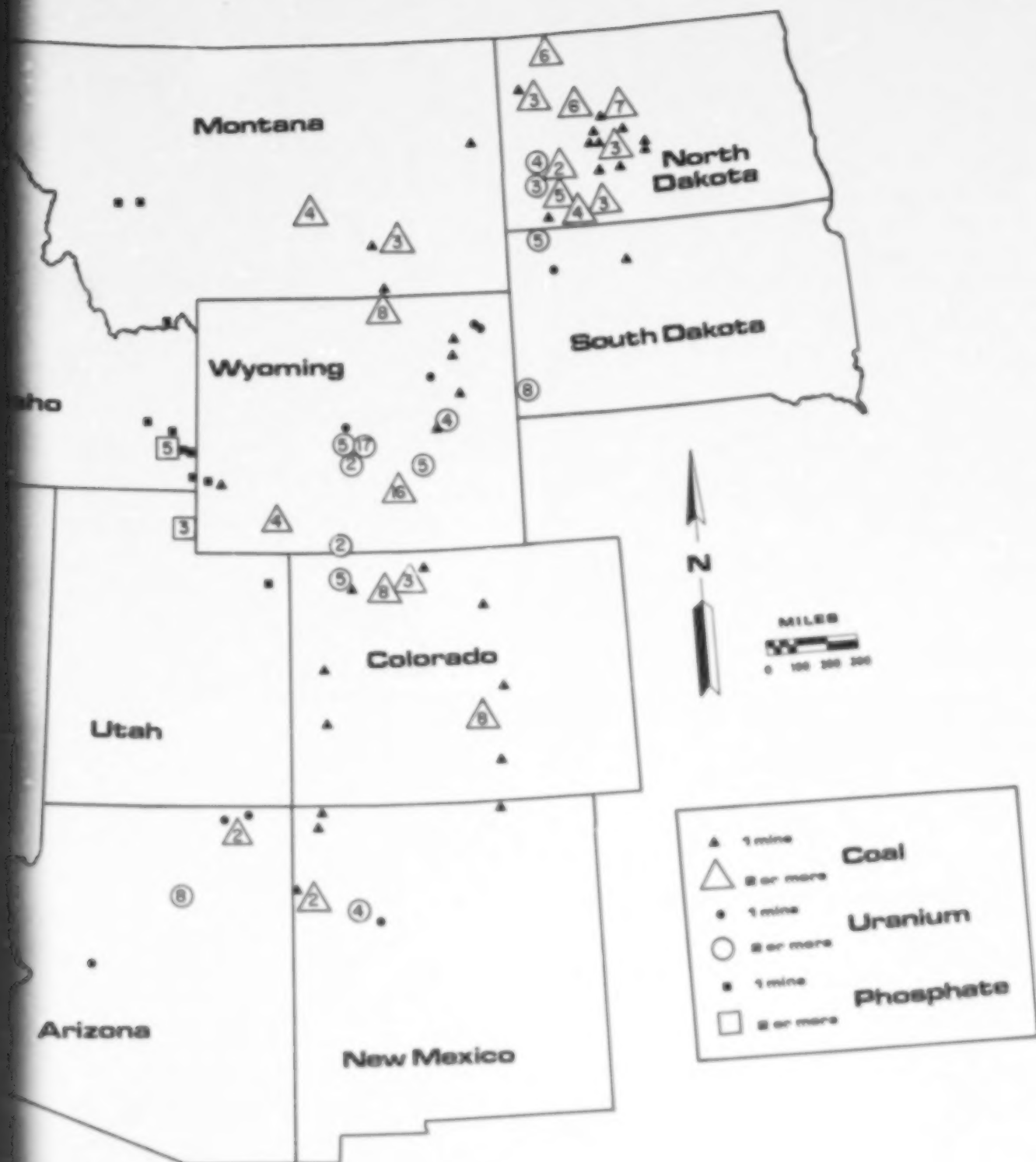
Data for inventoried mines in the states of Arizona and New Mexico are presented in Tables 1 and 2, respectively. Large-scale surface coal mining is a relatively recent phenomenon and abandoned coal mines are uncommon in the Southwestern Region. Current and projected surface-mined coal development is in the Four Corners area of both states. One abandoned and eight operating coal mines were inventoried in the region. In view of the importance of mining to the economies of Arizona and New Mexico, the number of identified mines appears less than would be anticipated, particularly in the older age classes. Copper has traditionally been the mineral of greatest surface-mining activity in the region. Because the large-scale equipment necessary for economical surface mining of coal was not available until relatively recently, most old surface coal mines tend to be quite small, often involving hand operations or bulldozer scrapings on outcrop areas. Larger deposits were typically mined by underground methods, due to the difficulty of removing overburden.

Four operating and nine abandoned surface uranium mines were inventoried in the Southwestern Region. Abandoned uranium mines dating from the 1950's are widely scattered throughout the region but are generally smaller than 10 acres. Several areas where these small mines are concentrated have been included in the Atlas because the total disturbance exceeded the 10 acre criterion. There are no surface phosphate mines of significance in Arizona or New Mexico.

In the Southwestern Region, the most significant environmental variable influencing natural revegetation or reclamation success is available moisture. Low and erratic precipitation rates, high winds, high temperatures, and low moisture retention of spoil material create a xeric environment inhibitive



Figure 1. Distribution of coal, uranium, and phosphate surface mines inventoried in the 13 western states.



uranium, and phosphate surface mines inventoried in the

to colonization by vegetation. Several research studies conducted at large coal mines in the Four Corners area have focused on ameliorating soil moisture conditions through various surface treatments. Conclusions are that mulches and irrigation during the first year of reclamation may be necessary for successful establishment of vegetation on mine spoils.

Arizona Summary

Totals of two surface coal mines, and eleven surface uranium mines (See Arizona map) were inventoried in Arizona; site visits were made to two coal mines and eight uranium mines.

Strippable coal deposits in Arizona are mined at the Black Mesa and Kayenta mines of Peabody Coal Company. These mines are located on Navajo tribal lands on Black Mesa, a dissected highland in the northeastern corner of Arizona. Both mines are relatively recent (5-8 years) and large (1200-1300 acres), and are reclaiming all spoils under Bureau of Indian Affairs guidelines. Natural vegetation on the mesa ranges from Juniper-Pinyon Woodland to Sagebrush Steppe. Highly permeable soils with low moisture retention, low and erratic precipitation (12 inches/year), and a high evapotranspiration rate (63 inches/year) create a highly xeric environment that challenges reclamation efforts. Successful species on reclaimed spoils include crested wheatgrass on spoil tops and western exposures, and slender and western wheatgrass on more mesic sites.

Nearly all Arizona uranium mines inventoried are small dozer-scraper mined pits from the 1950's. Most are located in the Painted Desert near the Little Colorado River. No attempts have been made to reclaim Arizona uranium mines. The climate is arid and the natural vegetation is dominated by halophytes such as fourwing saltbush, greasewood, and dropseed. Spoils have a high clay content which promotes runoff and inhibits infiltration of precipitation. Natural revegetation on spoils ranges from sparse to nonexistent. Vegetation on orphaned mines is in most cases confined to arroyos and mesic areas such as undrained depressions. Common dominants on Arizona uranium mines are Russianthistle, fourwing saltbush, and dropseed; tamarisk is common in mesic pits.

New Mexico Summary

Totals of one abandoned and five operating surface coal mines, and two abandoned and three operating surface uranium mines that met the criteria of this Atlas were located in New Mexico. Site visits were conducted at three coal mines and four uranium mines. Surface mining of coal and uranium is concentrated in the northwestern portion of New Mexico. The

operating coal mines are as old as 27 years, as large 3900 acres, and have reclaimed spoils as old as 5 years. They are located in Colfax, McKinley, and San Juan counties (see New Mexico map) and are currently reclaiming all spoils under strict supervision by the state. The operating uranium mines, as old as 26 years, are generally 10 acres to 30 acres in size with one of 2700 acres; they are located in McKinley and Valencia counties. Natural vegetation at the mined sites in New Mexico ranges from Juniper-Pinyon Woodland to various grassland types. Site xericity, caused by the low and erratic precipitation rates, the high evapotranspiration rates, and the low moisture retention of the unconsolidated sandy substrates, is the major limiting factor for success of both natural revegetation and applied reclamation. Reclamation research conducted at several of the larger coal mines has shown that drip or trickle irrigation may be necessary to ensure successful establishment of vegetation.

The amount of vegetative cover and composition on orphaned spoils in New Mexico is highly dependent upon substrate. Sandy spoils generally have low cover and are dominated by Indian ricegrass; whereas, spoils with heavier substrates have greater cover and are dominated by fourwing saltbush, rabbitbrush, and blue grama.

Expanded surface mining of coal is projected in the Four Corners area, and expanded surface mining of uranium is projected in Valencia and McKinley counties.

B. NORTHERN GREAT PLAINS REGION

The five states within the Northern Great Plains Region contain the greatest past, present, and potential mining activity for energy resources in the western United States. Because of the importance of agriculture, wildlife resources, and outdoor recreation to the economic integrity of the region, it is imperative that ecological impacts of surface mining be minimized. Therefore, the emphasis of this inventory of western surface mines has been concentrated within this region. Data for inventoried mines in the states of Colorado, Montana, North Dakota, South Dakota, and Wyoming are respectively presented in Tables 3, 4, 5, 6, and 7.

A total of 189 surface mines was inventoried for the five states of the Northern Great Plains Region; of these 120 were mined for coal, 65 for uranium, and 4 for phosphate. Numerous small coal and uranium pits have not been included in the inventory because they do not meet the size constraint, and several large mines have been excluded because they began operation after 1975. Some Colorado coal mines over 10 acres in size may have been mistakenly excluded based on size, because acreage

estimates provided by state sources were later found to be unreliable. Of the 189 mines located within the region, 116 were visited to collect on-site information; this information was supplemented with that from numerous other studies and information sources. In many cases, the data presented in the tables represent a "best estimate" based on the most reliable of several conflicting sources and should be so considered for interpretation.

A very large variety of site conditions occur at mined sites within the Northern Great Plains Region. Major environmental variables include precipitation rates, potential vegetation types, substrate chemistry and texture, topography, and elevation. The Northern Great Plains Region is characterized by a semi-arid climate with a short 4-month growing season. Precipitation is erratic and ranges from 7 inches/year in some mining districts of Wyoming to over 20 inches/year in the uranium mining area of the South Dakota Black Hills and the mountains of Colorado; generally evaporation potential greatly exceeds precipitation throughout the region. Varied textural properties of spoils at mined sites range from coarse-textured material with high permeability and low moisture retention to fine-textured material with low permeability and high moisture retention. Phytotoxic chemical properties that are not uncommon in overburden materials of the Northern Great Plains Region include high sodium and salinity levels.

Colorado Summary

Of the 31 surface mines located in Colorado, 26 are coal mines of which 10 are operating and 16 are inactive (Table 3). The remaining five mines are large uranium pits of the Maybell Operation in Moffat County. Although there is some current activity in all of these uranium pits, they are generally 10- to 20-year-old abandoned spoils. No phosphate mines were located in Colorado.

The coal mines in Colorado are concentrated in Fremont County, Routt County, and Jackson County with several scattered outliers (see Colorado map). Few of the Colorado surface coal mines contain spoils older than 35 years, several smaller mines are in the 16- to 35-year category, many are in the 5- to 15-year category but often have recent disturbance, and several of large acreage are in the 0- to 5-year class. The Fremont County coal mines of south-central Colorado demonstrate a variety of older-aged abandoned spoils with only two areas of recent reclamation. The Fremont County mines are concentrated within the Juniper-Pinyon Woodland vegetation type and demonstrate greatly varied degrees of natural revegetation depending on local substrate and moisture conditions.

The greatest current and future coal activity for the state is in central Routt County in northwestern Colorado where dominant vegetation types are Sagebrush Steppe and Mountain Mahogany-Oak Scrub. Several large mines, including the 500-acre Osage Strip, were treated in the mid-1960's by grading ridge crests, aerially seeding grasses and legumes, and planting trees. Although relatively stable vegetative covers have become established on some of these treated surfaces, much of the acreage is currently scheduled for retreatment under requirements of the recent state reclamation act. Extensive acreages of recently mined lands are currently under various stages of reclamation in the area. Success of these efforts cannot yet be critically evaluated because of insufficient time; the oldest postlaw treatments in the state occurred on the Energy Mine #2 in 1974.

The five Maybell uranium pits vary in size from 20 to 50 acres and are concentrated in a dry sandy area of Sagebrush Steppe vegetation to the west of the Routt County coal fields. A wide range of site conditions over a small geographical area support natural revegetation conditions ranging from almost barren to well-developed Sagebrush Steppe. These mines may be reclaimed in the future according to state regulations released in 1977.

Montana Summary

Ten coal and three phosphate mines were inventoried in Montana (See Montana map); of these, five coal and three phosphate mines were visited. Inventoried coal surface mines are concentrated in the southern Montana counties (Big Horn, Colstrip, Decker, Musselshell, and Rosebud counties) of the Powder River Basin. Surface-mined areas lie within the Eastern Ponderosa Forest or various grassland vegetation types. These areas receive about 15 inches of precipitation per year and reclamation is very successful at sites that have been topsoiled. The extent of natural revegetation on abandoned spoils is variable and depends, in part, upon the topography of spoils. At the Burlington Northern Colstrip Mine, the oldest Montana mine inventoried, the natural revegetation on old level spoils (from 1932) has developed native perennial vegetative cover equal to or greater than that of local native range. However, adjacent to this community, spoils with steep slopes are nearly barren.

In Montana, surface-minable phosphate occurs as outcrops in Powell and Beaverhead counties of the Centennial Range District. The vegetation type of the district ranges from Douglas Fir Forest to Eastern Ponderosa Forest. Outcrops occur on steeply sloping mountainsides and, therefore, are mined by open-cut or contour methods. All phosphate mines inventoried

are abandoned; one is scheduled for reclamation. Natural revegetation at the Anderson Mine has a good diversity of tree, shrub, and ground-layer species; vegetative cover is greatest on the level bench surface where moisture and finer soil material have accumulated.

North Dakota Summary

In North Dakota, 57 mines including 50 coal and 7 uranium mines, were inventoried. Visits were conducted at 19 coal and 5 uranium mines in 1977. Most coal mines and all uranium mines in North Dakota are inactive, but considerable future activity is anticipated.

North Dakota coal represents the eastern portion of the Northern Great Plains Coal Field; dominant strippable reserves are located in western North Dakota in Bowman, Burke, Dunn, Golden Valley, Williams, Oliver, and Mercer counties (see map). Generally, older inventoried coal mines are small contour or pit mines that worked outcrops along the draws associated with the Missouri River and its tributaries. Current mines are large-scale operations utilizing stripping methodologies.

Vegetation types in the coal-stripping region of North Dakota vary from Wheatgrass-Needlegrass to Wheatgrass-Bluestem-Needlegrass; Packer (79) rates species of these vegetation types as having fair to good suitability for mined-land reclamation. Precipitation rates in these types range from 12-15 inches/year. Although topsoil of the region is rated from good to excellent for the growth of plants, chemical and physical properties of the spoil provide a very poor environment for vegetation growth. Overburden is fine textured and is therefore subject to serious erosion. Upper layers may be moderately saline and lower strata are generally highly sodic and high in clay content.

Mined-land reclamation has been recorded in North Dakota since the 1930's. An excellent early example of revegetation is managed by the North Dakota Game and Fish Department at the Custer Mine near Garrison. Local community-improvement minded groups have been planting or seeding trees, shrubs, and herbaceous species at the site since the 1940's. Vegetation cover is well developed on the ridge-and-trough topography and this mine now serves as a state game management area. The Custer Mine is used by a variety of wildlife including deer, fox, pheasant, and waterfowl.

Most strip-mine reclamation in North Dakota is designed for agricultural postmining land uses such as grazing or hay cropping. Generally, spoils are recontoured, occasionally topsoiled, and seeded with pasture species such as smooth brome, western wheatgrass, alfalfa, and yellow sweetclover.

Vegetation stands in the first few years after reclamation are often dominated by summercypress and Russianthistle.

Natural revegetation on spoils is dominated, in early years, by summercypress, Russianthistle, and curlycup gumweed. Common dominants of upland spoils in later years are western wheatgrass, blue grama, and sweetclover. Mesic sites may be dominated by smooth brome, slender wheatgrass, bluegrass, snowberry and cottonwood; wet sites are colonized by cattail, bulrush, common reed, and willow. Sparse vegetation dominated by summercypress, Russianthistle, and curlycup gumweed may persist for many years on clay, sodic, or eroding spoils.

Surface-mined uranium deposits in North Dakota are located in the upper strata of lignite beds. Mines are located in southwestern North Dakota in Billings, Slope, and Stark counties. Climatic, vegetational, and spoil conditions are similar to those described for North Dakota coal.

Uranium mines are dozer-scraper, shallow-pit operations and, in many cases, the lignite was burned in situ to concentrate the uranium; the ash was then shipped for processing. Several land owners have seeded pasture species and one has seeded grasses and planted trees and shrubs for wildlife. Reclamation and natural revegetation at uranium mines are similar to those described for coal mines.

Land use at most abandoned mines is dedicated to grazing. Many mines with diverse topography or with water impoundments are also used by deer, waterfowl, and other wildlife. Although the land-use objectives of most reclamation programs is grazing, most treated lands are currently idle to allow stabilization of the vegetative cover.

Large-scale stripping operations, including mines with onsite power generating stations and mines with coal gasification plants, are projected or are currently under construction in North Dakota. Coal development will be concentrated in Oliver and Mercer counties.

South Dakota Summary

Of 15 mines inventoried in South Dakota, one was mined for coal and the remaining 14 were mined for uranium. Numerous smaller mines are scattered throughout the northwestern part of the state (see map). No coal or uranium mines are currently operating and none is reclaimed. Site visits were made to one coal and 10 uranium mines.

In South Dakota, strippable coal deposits are located in the northwestern portion of the state; this area forms the

southern portion of the Northern Great Plains Coal Field. Although many small coal mines exist in South Dakota, the Firesteel Mine, located in Dewey County, is the only coal mine large enough to be included in this inventory. Strip mining conducted at this site from 1925 to 1968 resulted in an estimated 60 acres of ridge-and-trough topography. Site conditions, such as moderate precipitation (15 inches/year) and non-toxic loamy substrates, have promoted relatively rapid revegetation by components of the native Wheatgrass - Needlegrass ecosystem and by introduced species. Older spoils are vegetated by a shrub stratum of silver sagebrush and a ground layer dominated by crested wheatgrass associated with western wheatgrass, green needlegrass and heath aster. Vegetation of younger spoils has similar components but has lower cover and a higher importance of weedy species. Much of the Firesteel Mine is presently used for grazing.

Significant surface-minable uranium deposits in South Dakota are concentrated in Harding County in the northwest and in the Edgemont Mining District of Fall River County in the southwest. Most mines are located on public lands utilized for grazing. Mining in both areas began around 1953, activity increased until about 1964, and then declined through 1970 after U.S. Government price support was eliminated and market demand decreased. Ore exploration has been active in Fall River County in recent years and renewed production is projected for this area.

Uranium deposits in Harding County occur as organo-uranium compounds in lignite deposits, whereas deposits in Fall River County occur in thin sandstones and siltstones interbedded with carbonaceous shales. In both cases the overburden is consolidated sandstone. Surface substrates at mined sites varied from coarse sands and rocks, often with oxidized pyrite, to lignite coal. Coarse sandy substrates drain rapidly and have low moisture retention levels producing a xeric environment, and lignite and pyrite often produce phytotoxic materials upon oxidation. Thus, although both uranium mining areas are located in a transition area between the Blackhills Pine Forest and the Wheatgrass - Needlegrass vegetation units, and receive approximately 15 inches of precipitation per year, natural revegetation is progressing slowly. Weedy species such as summercypress, Russianthistle and curlycup gumweed are common at most sites. In general, natural revegetation of sites mined for uranium in South Dakota has proceeded much more slowly than on sites mined for coal due to the aforementioned substrate conditions.

Wyoming Summary

Of the 73 surface mines inventoried in Wyoming, 33 are coal mines, 39 are uranium mines, and 1 is a phosphate mine (see

Wyoming map). Approximately one half of the coal and uranium mines, and the one phosphate mine, are currently operating. Site visits were made to 26 coal and 24 uranium mines.

Wyoming's strippable coal deposits are located in the Powder River Coal Basin, Hanna Coal Field, Green River Coal Region, and Ham's Fork Coal Region. The Hanna coal mining district is located in southeastern Wyoming in Carbon County. The highest concentration of inventoried coal mines, nearly one half, occurred in the Hanna district where all age classes of mines are represented. Surface mining has been active in this district since 1937 when Monolith's Hanna No. 1 opened. Currently, nearly all active mines in the district are surface operations. Wyoming's earliest coal mine reclamation was conducted in 1964 at the Rosebud No. 1 & 2 mines in the Hanna District; spoil slopes were reduced, crested wheatgrass was drilled, trees were planted in experimental plots, and the site was irrigated for 2 years. The result was fairly successful.

The Powder River Basin is located in northeastern Wyoming with strippable coal located in Campbell, Converse, and Sheridan counties. Coal beds exceeding 40 feet thick with very thin partings are a unique feature of the Gillette area. Due to these extremely thick beds, the greatest future surface-mine coal development and production in Wyoming are projected for this area. The Wyodak mine, located in the Gillette area, is the oldest surface mine inventoried in Wyoming; it opened in 1925 and is still in operation. More recent operations in this area are the Belle Ayr and Cordero mines. Prior to the early 1970's, most coal development in the Powder River Basin occurred in the Sheridan area; dates of mining range from 1943 to the present. The earliest reclamation in the Powder River Basin was conducted at the Big Horn Coal Company's Planchek Pit in 1964. Good plant cover and diversity have been achieved at this site.

The strippable coal of the Green River Region is located in the vicinity of Rock Springs. Two abandoned (approximately 20 years old), one reclaimed, and one operating mine were inventoried in this area. Precipitation is low, and both reclamation and 20 years of natural revegetation have yielded little vegetative cover.

In the Ham's Fork Region only one surface coal mine, the Elkol-Sorenson Mine, was inventoried. Surface mining has been active at this mine since 1950. Reclamation at this site has been ongoing since 1965 and has met with varied success depending upon substrate. Natural revegetation of older spoils has developed a relatively high diversity of plant species and plant community types.

Uranium mining throughout Wyoming began in the mid 1950's. Active and inactive uranium mines are concentrated primarily in three areas: the Gas Hills District of the Wind River Basin, the Shirley Basin District of the Shirley Basin, and the Powder River District of the Powder River Basin (see Wyoming map). A small number of mines are scattered throughout the eastern half of the state. The Gas Hills and Shirley Basin uranium districts lie within the Sagebrush Steppe vegetation type, and the Powder River District lies within the Wheatgrass-Needlegrass and Grama-Needlegrass-Wheatgrass vegetation types. In each district, the economically important uranium-ore-bearing strata are eocene fluvial or alluvial arkose or sandstone formations; the richest ore deposits are erratically distributed in tongue-shaped lenses. Due to the above features, most older uranium mines are small pit mines and have spoils composed of sands and gravels. In recent years, with the rise in the value of uranium and advances in mining technology, the economic feasibility of profitably mining lower-grade deposits has resulted in the development of larger pits, the reactivation of abandoned mines, and even the reworking of older spoils. The success of natural revegetation on uranium-mine spoils is varied and is related to the physical and chemical properties of the spoils. Selenium and pyrite are phytotoxic compounds that are often associated with ore deposits. Spoils having heavier soil material with a greater moisture-retaining capacity often have greater vegetative cover. Some species such as big sagebrush do well only on substrates containing at least small amounts of clay. Indian ricegrass is a common perennial at many sites. Topsoiling of spoils greatly increased the degree of natural revegetation and appears to be a procedure essential in reclamation of Wyoming uranium mines. Although Wyoming law states that mine reclamation must begin at the earliest possible time and continue concurrently with mining, the value of current spoils as future millable ore has often been cause for postponing the reclamation of extensive uranium spoil areas.

Wyoming's phosphate deposits form the eastern fringe area of the Western Phosphate Field. These deposits, for the most part, are relatively thin, steeply-sloping beds of sub-marginal quality. Geographically, outcrops are remote to utility, rail transportation, and processing facilities. Only one phosphate mine, the Leefe Mine, has disturbance of over 10 acres in Wyoming. The Leefe Mine, which opened in 1947, is located in the Beckwith Hills District of southwestern Wyoming where phosphate deposits are of higher quality and the dip of the phosphorite beds is only about 15 degrees. Annual precipitation in this region is low and early reclamation attempts using native species sown into untopsoiled spoil have not done well; however, more recent revegetation efforts utilizing topsoiling of recontoured spoils and seeding with crested wheatgrass, an introduced species, has resulted in relatively high-density grass stands.

Natural revegetation on older spoils has resulted in greater than 50 percent ground cover by big sagebrush and native grasses.

Additional surface development of phosphate deposits is not projected for the near future; however, three areas, the Wind River, Sublette, and Salt River ranges in southwestern Wyoming, may contain sufficient reserves to warrant economic ore retrieval.

C. INTERMOUNTAIN REGION

In the intermountain region, 14 phosphate mines were inventoried (see map). Although coal and uranium surface mines are currently under development and underground and small-scale surface mining of both commodities has occurred in the past, no coal or uranium mines met the criteria of this inventory. Most inventoried phosphate mines are located in southeastern Idaho; southeastern Idaho is the center of the Western Phosphate Field and contains the bulk of the field's phosphate reserves. Several inventoried mines are also located in two counties of northeastern Utah.

Regional ecological conditions vary from the semiarid Juniper-Pinyon Woodland, at the Vernal Mine, to the more mesic Douglas Fir Forest that is prevalent at mined sites in Idaho. Reclaimed and orphaned areas located in the Douglas Fir Forest vegetation unit are revegetating rapidly in many cases, due to precipitation rates greater than 20 inches/year and the non-phytotoxic nature of spoil materials. Reclamation in the Juniper-Pinyon Woodland vegetation unit has been slow and difficult. Reclamation programs at inventoried phosphate mines were generally designed to return mined land to a rangeland ecosystem with grazing as the land-use objective; however, several mines included provisions in their mining plans for wildlife migration routes and wildlife use. Big game species such as deer, elk, and moose have been reported at all inventoried mining sites in Idaho.

Idaho Summary

In Idaho, 10 phosphate mines were inventoried of which more than one half were reclaimed; no coal or uranium mines met the inventory criteria. Seven site visits were conducted in 1977.

Idaho phosphate deposits are concentrated in the extreme southeastern corner of the state in Bannock, Bear Lake, Bingham, Bonneville, Freemont, Teton, Madison, and, particularly, Caribou Counties (see map). Although limited in areal distribution, Idaho's phosphate deposits represent the greatest

portion of phosphate resources in the Western Phosphate Field. Phosphorite beds are approximately 200 feet thick and are overlain by mudstones, carbonate rock, and chert; overburden is seldom phytotoxic. Beds may be folded, faulted, and may vary in dip from horizontal to vertical; mining practices vary accordingly. Open cut or surface contour mining is employed at locations such as the Diamond Gulch Mine where steeply dipping beds follow the contour of the hillside. Pit mining is conducted at sites such as the Ballard Mine or the Gay Mine where phosphorite beds outcrop or where beds have less slope.

Inventoried mines occur at elevations from 6500-8000 feet and vegetation types vary from Sagebrush Steppe at lower elevations, to Douglas Fir Forest at higher elevations. Mean annual precipitation in the region is generally greater than 20 inches/year. Therefore, due to the relatively high rate of precipitation and the nonphytotoxic spoils, both reclaimed and orphaned areas are generally revegetating rapidly.

Various degrees of reclamation have occurred in the Idaho phosphate fields for over 10 years. A major reclamation problem faced by producers is that of backfilling over lower-grade deposits that might eventually be economical to mine. Common reclamation procedures conducted at inventoried mines include back-filling of pits, contouring of spoils, followed by topsoiling or covering of spoils with a fine-textured nontoxic substrate, and drill-seeding or broadcasting a predominantly non-native mixture of grasses and legumes specified by the U.S. Forest Service. Reclaimed areas have dense stands of herbaceous vegetation commonly dominated by introduced species such as alfalfa, yellow sweetclover, smooth brome, and various wheat-grasses. Natural revegetation consists of rapid invasion by big sagebrush and rabbitbrush associated with native grasses; other commonly occurring species are bitterbrush, aspen, and chokecherry.

Wildlife is reported from many of the mines. Ponds in pits are used by waterfowl; and big game including deer, elk, and moose utilize or migrate through many of the mine sites. Unmined areas have been left at several mines to serve as game corridors across highwalls.

Utah Summary

Four phosphate surface mines were inventoried in the state of Utah. Although surface and underground coal and uranium mines are present in Utah, no surface mines met the size criterion for inclusion (142). No mine visits were conducted at Utah phosphate mines, because site visits were made to several phosphate mines in the Idaho phosphate district that is contiguous with the phosphate district in Utah.

Phosphate deposits in northeastern Utah, located in the Crawford Mountains, Uinta Range, and Wasatch Range, represent the southern fringe of the Western Phosphate Field which predominates in southeastern Idaho and southwestern Montana. The first large-scale phosphate surface mining in Utah began in 1960 at the Vernal Mine in Uinta County. At this location, bedded dip-slope and benchlike phosphorite deposits outcrop flanking the Uinta Mountains. Reclamation at the Vernal Mine has been difficult due to the semiarid climate associated with the Juniper-Pinyon ecosystem. Reclamation, which has been in progress since 1972, consists of seeding backfilled spoils with a grass mixture composed primarily of introduced wheatgrasses; crested wheatgrass dominates at reclaimed sites.

Surface mining was conducted in the Crawford Mountains from 1972 to 1976; mining and environmental conditions in the Crawford Mountains differ from those of the Vernal area. Phosphorite beds in this area are extremely faulted and folded with steep dips frequently greater than 50 degrees. Due to the steep dip of the bedded deposits, surface mining has been limited to contour mining of outcrops along ridges or to pit mining on the strike. The vegetation in the Crawford Mountains varies from Sagebrush-Steppe to Douglas Fir Forest. Reclamation procedures have consisted of seeding backfilled spoils with introduced grasses. A dense stand of crested wheatgrass is reported at the Rex Peak-Brazier Canyon Properties Mine. Natural revegetation composed of trees and grasses is reported on older unreclaimed spoils in the area.

D. FAR WESTERN REGION

Although considerable exploration for coal and uranium has occurred in the Far Western Region, very few surface mines met the criteria of this inventory (see map). For this reason, individual state summaries are not provided. One large coal mine occurs in western Washington and several uranium mines are active in eastern parts of the state. Oregon contains one uranium mine in southcentral Lake County. Nevada contained no mines that met the criteria, although the Apex Uranium Mine is almost 10 acres and may eventually be reopened. California has extensive surface disturbance from past placer mining for gold, but contained no surface mines for coal, uranium, or phosphate of sufficient size for inclusion in the Atlas.

The Centralia Coal Mine in Lewis and Thurston counties, Washington, is one of the largest surface coal mines in the western U.S., although it has only operated for 6 years. Water quality and erosion control are of primary concern in reclamation at the Centralia Mine because of the high precipitation rate in western Washington. The high precipitation rate

facilitates rapid vegetation colonization and growth with proper fertilization, and reclamation for a variety of land uses is under consideration.

Of the two uranium mines near Spokane, Washington, the Midnite-Boyd Lease is the largest at several hundred acres. Both mines are on Indian lands and are currently under active development with no reclamation to date. The White King Uranium Mine in south-central Oregon is small but will be expanded in the future; no reclamation has been conducted to date. The uranium mines in both states date from the 1950's and are reported to have some natural colonization by ponderosa pine on older spoils; future mining will probably disturb most naturally revegetated spoil areas.

IV. OVERVIEW

A total of 231 mines; 72 operating and 159 inactive, were inventoried in the 13-state area encompassed by the scope of this Atlas. The number of inventoried coal, uranium, and phosphate mines total 129, 84, and 18, respectively. Respective estimated acreages of disturbance by coal, uranium, and phosphate mining are 44459 acres, 10472 acres, and 6163 acres for a total of 61094 acres (Table 12). Of these 61094 acres, an estimated 16159 acres have been reclaimed. These acreage values are estimates and do not represent the total mining disturbance because they do not include mines or exploratory diggings of less than 10 acres, or associated disturbances such as roads and processing facilities.

The majority (approximately 82 percent) of mines and the greatest disturbed acreage are located in the Northern Great Plains Region. Coal and uranium activity are concentrated in this region. Approximately 10 percent of inventoried mines are located in the Southwestern Region; commodities mined in this region are also coal and uranium.

Phosphate mining is primarily confined to the Inter-mountain Region; phosphate constituted all mines for this region and 6 percent of the total mines inventoried. Less than 2 percent of inventoried mines occur in the Far Western Region. One coal and two uranium mines are located in Washington, and one uranium mine is located in Oregon. No mines were recorded from California or Nevada.

The size and age distribution of inventoried mines is related to past and present commodity demand, depositional characteristics of the commodity, and mining technology. Spoil age classes for all inventoried mines are presented in Table 13. Older coal surface mines are generally small dozer pits in shallow deposits or outcroppings, or are small contour mines. Due to advances in mining technology and increases in market demand, more recently mined sites are large and have utilized stripping methodologies. The oldest coal mines are located in North Dakota where many mines are older than 35 years and have usually been abandoned for several years. Many mines in the Northern Great Plains Region have operational histories encompassing several age classes; often older spoils are orphaned and more recent spoils have been reclaimed within the same mine property.

The majority of inventoried uranium mines are small pit mines averaging 15 years in age. This is due to the erratic and limited distribution of uranium ore and to the past market demand for uranium which was concentrated in the late 1950's. Most uranium mines were abandoned by the mid-60's but a recent increase in uranium demand has promoted the development of new

Table 12. Number of mines, and total and treated acreage, for all coal, uranium, and phosphate mines inventoried in the western 13 states, organized by state and region.

State	Commodity	No. of Active Mines	No. of Inactive Mines	Estimated Treated Acreage	Estimated Total Mined Acreage
Arizona	C ^A	2		100	1900
	P ^B		11		191
	Total	2	11	100	2091
New Mexico	C	3	1	2072	5681
	U	1	2	80	2798
	Total	4	3	2152	8479
Colorado	C	10	18	3551	5890
	U	1	6		160
	Total	11	24	3551	6050
Montana	C	7	3	2612	4676
	P ^B		1		37
	Total	7	4	2612	4713
North Dakota	C	9	41	850	17817
	U		7		205
	Total	9	48	850	18022
South Dakota	C		1		60
	U		14		345
	Total	0	15	0	405
Wyoming	C	12	21	3622	10355
	U	12	27	1146	6483
	P	1			700
	Total	25	48	4768	17538
Utah	P	5	5	1392	4726
	Total	5	5	1392	4726
Idaho	P	1	2	125	700
	Total	1	2	125	700
Oregon	U	1			20
	Total	1	0	0	20
Washington	C	1		407	2260
	U	2			270
	Total	3	0	407	2530

Table 12. (continued)

Region	Commodity	No. of Active Mines	No. of Inactive Mines	Estimated Treated Acreage	Estimated Total Mined Acreage
Southwestern	C	7	1	2172	8181
	U	3	13	80	2989
	Total	10	14	2252	11170
Northern Great Plains	C	38	82	10835	33998
	U	13	52	1148	7193
	P	1	3		717
	Total	52	137	11983	41928
Intermountain	P	6	8	1517	5426
	Total	6	8	1517	5426
Far Western	C	1		407	2280
	U	3			290
	Total	4	0	407	2570
11 State Total	C	46	83	13414	44459
	U	19	65	1228	10472
	P	7	11	1517	6163
Grand Total		72	159	16159	61094

CA - Coal
CU - Uranium
PC - Phosphate

Table 13. Reclamation status and spoil age classes for all coal, uranium, and phosphate mines inventoried in the western 13 states.

Mine	Reclamation Status							Age Class		
	Reclamation in			Reclamation Status						
	Active	Progress or Proposed	Treated not Graded	Graded and Treated	Orphaned	Unknown		0-5	6-15	16-35 >35
Southwestern Region										
Arizona (Coal)										
AR 1	X	X		X				X	X	
AR 2	X	X						X		
(Uranium)										
AR 3					X				X	X
AR 4					X				X	X
AR 5					X				X	X
AR 6					X				X	X
AR 7					X				X	X
AR 8					X				X	X
AR 9					X				X	X
AR 10					X				X	X
AR 11					X				X	X
AR 12					X				X	X
AR 13					X				X	X
New Mexico (Coal)										
NM 1	X	X						X	X	X
NM 2		X			X			X	X	X
NM 3	X	X		X				X	X	X
NM 4	X	X		X				X	X	X
NM 5	X	X		X				X	X	X
NM 6	X	X		X				X	X	X

Table 13. (continued)

Mine	Reclamation Status						Age Class			
	Active	Reclamation in Progress or Proposed	Treated not Graded	Graded and Treated	Orphaned	Unknown	0-5	6-15	16-35	>35
New Mexico (continued)										
(Uranium)										
NM 7					X			X	X	
NM 8	X	X			X		X	X	X	
NM 9	X	X		X	X		X	X	X	
NM 10	X				X		X	X	X	
NM 11					X			X		
Colorado										
(Coal)										
CO 1					X			X		
CO 2				X	X		X	X		
CO 3					X			X	X	
CO 4					X			X		
CO 5			X					X	X	
CO 6	X				X		X			
CO 7					X		X			
CO 8					X					
CO 9	X	X		X			X	X	X	
CO 10	X	X		X			X	X		
CO 11	X	X		X			X	X		
CO 12	X	X		X			X			
CO 13					X				X	
CO 14					X				X	
CO 15	X	X		X			X	X	X	
CO 16										
CO 17	X	X					X			
CO 18									X	X
CO 19			X		X				X	X

Table 13. (continued)

Reclamation Status										Age Class				
Mine	Reclamation in Progress or Proposed			Treated not Graded			Graded and Treated			Unknown	Age Class			
	Active	Proposed	Graded	Graded	not Graded	Treated	Graded	Treated	0-5		6-15	16-35	>35	
Colorado (continued)														
CO 20	X									X	X			
CO 21			X									X		
CO 22							X					X		X
CO 23					X									
CO 24	X									X	X			
CO 25							X					X		
CO 26	X									X				
(Uranium)														
CO 27							X				X	X		
CO 28							X				X	X		
CO 29							X				X	X		
CO 30	X						X				X	X		
CO 31							X				X	X		
Wyoming (Coal)														
WY 1	X							X			X			
WY 2								X						
WY 3									X			X		
WY 4									X			X		
WY 5									X			X		
WY 6									X			X		
WY 7									X			X		
WY 8	X		X					X			X			
WY 9								X			X			
WY 10								X			X			
WY 11	X		X		X					X		X		
WY 12							X					X		

Table 13. (continued)

Reclamation Status										
Mine	Reclamation				Orphaned	Unknown	Age Class			
	Active	Progress or Proposed	Treated not Graded	Graded and Treated			0-5	6-15	16-35	>35
Wyoming (continued)										
WY 13										
WY 14	X	X		X				X	X	
WY 15	X	X		X						
WY 16								X	X	
WY 17								X		
WY 18				X						
WY 19				X						
WY 20	X	X		X				X	X	
WY 21				X						
WY 22				X						
WY 23	X	X								
WY 24				X						
WY 25				X						
WY 26				X				X		
WY 27	X	X		X				X		
WY 28	X	X		X						
WY 29	X	X		X						
WY 30				X						
WY 31				X				X	X	
WY 32	X	X		X				X		
WY 33	X	X		X				X		
WY 34				X						
WY 35				X				X	X	
WY 36								X	X	
WY 37								X	X	
WY 38								X	X	
WY 39								X	X	
WY 40								X	X	
WY 41				X			X			

Table 13. (continued)

Mine	Reclamation Status							Age Class		
	Active	Reclamation in progress or Proposed	Treated not Graded	Graded and Treated	Orphaned	Unknown		0-5	6-15	>35
Wyoming (continued)										
WY 42		X						X	X	X
WY 43				X				X	X	X
WY 44				X				X	X	X
WY 45	X	X						X	X	X
WY 46	X					X		X	X	X
WY 47				X				X	X	X
WY 48	X	X		X				X	X	X
WY 49				X				X	X	X
WY 50	X	X		X	X			X	X	X
WY 51	X			X	X			X	X	X
WY 52				X				X	X	X
WY 53				X				X	X	X
WY 54				X				X	X	X
WY 55	X	X						X	X	X
WY 56								X	X	X
WY 57								X	X	X
WY 58	X	X						X	X	X
WY 59								X	X	X
WY 60								X	X	X
WY 61								X	X	X
WY 62								X	X	X
WY 63								X	X	X
WY 64	X	X						X	X	X
WY 65								X	X	X
WY 66								X	X	X
WY 67	X					X		X	X	X
WY 68								X	X	X
WY 69	X	X						X	X	X

Table 13. (continued)

Mine	Reclamation Status							Age Class			
	Reclamation										
	Active	Progress or Proposed	Treated not Graded	Graded and Treated	Orphaned	Unknown		0-5	6-15	16-35	>35
Wyoming (continued)											
WY 70	X	X			X			X	X	X	
WY 71					X			X	X	X	
WY 72	X	X						X	X	X	
(Phosphate)											
WY 73	X	X		X				X	X	X	
Montana											
(Coal)											
MT 1	X	X		X				X	X	X	X
MT 2				X				X	X	X	
MT 3				X				X	X	X	
MT 4	X	X		X				X	X	X	
MT 5	X	X		X				X	X	X	
MT 6	X	X		X				X	X	X	
MT 7	X	X		X				X	X	X	
MT 8	X	X		X				X	X	X	
MT 9	X	X		X				X	X	X	
MT 10	X	X		X				X	X	X	
(Phosphate)											
MT 11									X	X	
MT 12									X	X	
MT 13								X	X	X	
North Dakota											
(Coal)											
ND 1					X					X	X
ND 2		X			X			X	X	X	

Table 13. (continued)

Mine	Reclamation Status						Age Class			
	Reclamation in Progress or Proposed			Reclamation Status			Age Class			
	Active	Proposed	Treated or Graded	Treated not Graded	Graded and Treated	Orphaned Unknown	0-5	6-15	16-35	>35
North Dakota (continued)										
ND 3	X	X			X	X	X	X	X	X
ND 4						X		X	X	X
ND 5						X		X	X	
ND 6	X	X			X		X	X	X	X
ND 7						X		X	X	X
ND 8						X		X	X	X
ND 9			X			X	X	X	X	X
ND 10					X	X	X	X	X	X
ND 11						X	X	X	X	X
ND 12						X	X	X	X	X
ND 13						X	X	X	X	X
ND 14	X	X			X		X	X	X	X
ND 15	X	X			X		X	X	X	X
ND 16										
ND 17										
ND 18	X	X			X	X	X	X	X	X
ND 19										
ND 20	X	X			X	X	X	X	X	X
ND 21										
ND 22										
ND 23										
ND 24										
ND 25										
ND 26										
ND 27	X	X			X	X	X	X	X	X
ND 28				X		X	X	X	X	X
ND 29										
ND 30										
ND 31										

Table 13. (continued)

Mine	Reclamation Status						Age Class		
	Reclamation								
	Active	Progress or Proposed	Treated not Graded	Graded and Treated	Orphaned	Unknown	0-5	6-15	16-35 >35
North Dakota (continued)									
ND 32			X					X	X
ND 33					X			X	X
ND 34					X			X	X
ND 35					X			X	X
ND 36					X			X	X
ND 37					X			X	X
ND 38					X			X	X
ND 39					X			X	X
ND 40					X			X	X
ND 41	X					X	X	X	X
ND 42					X			X	X
ND 43					X			X	X
ND 44					X			X	X
ND 45					X			X	X
ND 46		X			X		X	X	X
ND 47				X			X	X	X
ND 48			X				X	X	X
ND 49							X	X	X
ND 50					X			X	X
(Uranium)									
ND 51					X			X	
ND 52			X		X			X	
ND 53					X	X		X	
ND 54			X		X			X	
ND 55					X			X	
ND 56					X			X	
ND 57			X		X			X	

Table 13. (continued)

Mine	Reclamation Status					Age Class		
	Reclamation		Reclamation Status			Age Class		
	Active	Progress or Proposed	Treated not Graded	Graded and Treated	Orphaned Unknown	0-5	6-15	16-35 >35
South Dakota								
(Coal)								
SD 1				X		X	X	X
(Uranium)								
SD 2				X		X	X	X
SD 3				X		X	X	X
SD 4				X	X	X	X	X
SD 5				X		X	X	X
SD 6				X		X	X	X
SD 7				X		X	X	X
SD 8				X		X	X	X
SD 9				X	X	X	X	X
SD 10				X		X	X	X
SD 11				X		X	X	X
SD 12				X		X	X	X
SD 13				X		X	X	X
SD 14				X		X	X	X
SD 15				X		X	X	X
Idaho								
(Phosphate)								
ID 1		X		X		X	X	X
ID 2	X	X		X		X	X	X
ID 3			X			X	X	X
ID 4	X			X		X	X	X
ID 5			X			X	X	X
ID 6	X	X		X		X	X	X
ID 7	X	X		X		X	X	X
ID 8			X		X	X	X	X

Intermountain Region

Table 13. (continued)

Mine	Reclamation Status						Age Class		
	Reclamation in Progress or Proposed			Treated Graded and Treated Orphaned Unknown			0-5 6-15 16-35 >35		
	Active	Proposed	Treated not Graded	Treated Graded	Orphaned	Unknown	0-5	6-15	16-35 >35
Idaho (continued)									
ID 9		X			X				X
ID 10	X	X	X				X	X	
Utah (Phosphate)									
UT 1				X			X		
UT 2			X				X		
UT 3			X				X		X
UT 4	X	X	X				X		
Oregon (Uranium)									
OR 1	X					X		X	X
Washington (Coal)									
WA 1	X	X	X				X	X	
(Uranium)									
WA 2	X	X					X	X	X
WA 3	X	X						X	X

Far Western Region

mines and the reopening of old ones. Mining of large-area, lower-grade ore deposits is now economically feasible and new mines are generally larger than older ones.

All phosphate mines inventoried in this Atlas are located in an area designated as the Western Phosphate Field centered in southeastern Idaho. Phosphate beds occur in mountainous terrain and most often dip so steeply that they are suited only to underground mining; it is only within the last 20 years that much surface mining of phosphate has occurred in the West. Surface phosphate mines are usually long contour or pit operations that follow ridges or mountainsides. With new processing and transportation facilities and heavier market demand, surface production will likely increase considerably in the Western Phosphate Field.

The geographical distribution of mines and total acres disturbed by mining is such that the greatest disturbance has been within the grassland ecosystems of the Northern Great Plains and the Sagebush Steppe vegetation unit of the Northern Great Plains and Intermountain regions (Table 14). Major grassland vegetation units disturbed by mining include the Wheatgrass-Needlegrass, Wheatgrass-Bluestem-Needlegrass, and Grama-Needlegrass-Wheatgrass units. Forested vegetation units with significant disturbance by mining are the Eastern Ponderosa Forest of the Northern Great Plains Region and the Douglas Fir Forest of the Northern Great Plains and Intermountain regions. The Juniper-Pinyon Woodland vegetation unit is a woodland ecosystem with significant disturbance, particularly in the Southwestern Region. Precipitation patterns and/or spoil characteristics in the above vegetation types, with the exception of the Douglas Fir Forest, are such that natural revegetation takes place slowly and reclamation is difficult.

A variety of reclamation programs and techniques are showing promise of success in the West, but it is apparent that a reclamation program must be tailored to the particular regional and site-specific conditions and that firm land-use objectives are essential during the planning stages. Success and speed of revegetation are closely correlated to those conditions that determine moisture availability for plant growth, primarily precipitation rate, substrate texture, and salinity. Common reclamation procedures practiced at many sites include the segregation of phytotoxic strata, the recontouring of spoils to slopes approximating the pre-mining topography, topsoiling, and seeding with various grass species. Other practices, less commonly used, are mulching, surface texturing to retard runoff, fertilizing, and irrigating. Introduced species are often used in reclamation programs due to their drought hardiness. Monospecific stands of crested wheatgrass, an introduced species, were commonly seeded in the past. The temporal stability of

Table 14. (continued)

		Potential Natural Vegetation Types		(No. of Mines Est. Accrue)	
State	Commodity				
Region					
Southwestern	C	7977	1	96	105
	U	1,566	10	1,462	153
Northern					
Great Plains	C	1,130	1	1	1
	U	20	1	1	1
	P	-	1	1	1
Intermountain	P	250	1	1	1
Far Western	C	-	1	1	1
	U	-	1	1	1
11 State Total	C	9,107	230	711	711
	U	1,566	10	1,462	153
	P	250	1	1	1
Grand Total		10,743	10	1,462	153
C ¹ - Coal U ² - Uranium P ³ - Phosphate					
Western Ponderosa Forest Ponderosa Shrub Forest Douglas Fir Forest Douglas Fir Forest Eastern Ponderosa Forest Black Hills Pine Forest Northern Floodplain Forest Wheatgrass-Bluestem Wheatgrass-Needlegrass Wheatgrass-Needlegrass Wheatgrass Grass-Needlegrass Shrub Steppe Wheatgrass-Needlegrass Grass-Butterflygrass Oak Shrub Mountain Mahogany Sagebrush-Creosote Sagebrush-Creosote Sagebrush-Creosote Grass-Collared Steppe Blackbrush Great Basin Sagebrush Creosote Bush-Burrago Juniper-Boxwood Woodland					

ecosystems, particularly monocultures, composed of introduced species is often very low, and recently this practice has become less common. Current emphasis is on the use of native species, for which seed sources are often unavailable.

Vegetation stands on orphaned mine spoils in the western states are extremely varied. Early years of natural revegetation are often dominated by introduced annuals and halophytes; under adverse conditions such as xericity, high salinity, erosion, and grazing, this condition may persist for several decades. The diverse topography common to orphaned mines is responsible for a large variety of ecological conditions most of which are moisture-related, often allowing a diversity of vegetation community types to occur within a small area. Xerophytic species dominate spoil crests and slopes with southwestern exposures, and the more mesophytic species are found dominating northeastern slopes and moist depressions. Many inventoried mines with water accumulated in pits had well-developed marsh habitats.

Reclamation for wildlife habitat is not a primary option under most western mining laws but can definitely be specified as a secondary land use. Generally, reclamation for grazing land does not maximize value to wildlife because of the minimal diversity of vegetative species composition and structure, topography, and water conditions. The great variety of niches available on some older orphaned mines that have revegetated naturally appears to support greater wildlife diversity than the large reclaimed mines that are used primarily by a few large mammal species. Quantitative wildlife population data from western mined lands are required to verify this observation. Incorporation of wildlife habitat requirements, primarily topographic diversity and a diversified vegetation structure and composition, into reclamation programs can often provide a less expensive reclamation alternative that is valuable to the regional ecological stability, diversity, and productivity. This option should be available through surface-mining regulation and enforcement programs.

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APPENDIX A

Operator and Ownership for
Inventoried Mines, Locating
Directions for Visited Mines

SOUTHWESTERN REGION

ARIZONA (COAL)

Peabody Coal Co.: AR 1, AR 2
P.O. Box 605
Kayenta, Arizona 86033

Contact - Walter Begay Jr.
(Reclamation Supervisor of Arizona Operations)

AR 1 Black Mesa Strip Mine
Surface and Subsurface Owner: Navajo Tribe

Locating Directions: Take US Rt. 160 approximately
15 miles south of junction US Rt. 160-163;
head east on to Black Mesa and continue to
Black Mesa Strip Mine.

AR 2 Kayenta Mine
Surface and Subsurface Owner: Navajo Tribe

Locating Directions: Take US Rt. 160 approximately
15 miles south of junction Rt. 160-163; head
east on to Black Mesa. Kayenta Mine is
approximately 5 miles past Black Mesa Mine.

ARIZONA (URANIUM)

Minerals Exploration Co.
1848 W. Grant Road
Tucson, Arizona 85705

AR 3 Anderson Mine
Subsurface Owner: Bureau of Land Management

Navajo Tribe: AR 4, AR 5, AR 6, AR 7, AR 8, AR 9, AR 10, AR 11,
AR 12, AR 13

Contact - Mr. W. D. Armstrong
Bureau of Indian Affairs
Energy Resources Department
Box 146
Window Rock, Arizona 86515

AR 4 Charles Huskon 4, Paul Huskie 3
Operator: Utco Uranium Corp.

Locating Directions: Take main road into Wupatki National Monument about 1/4 mile past visitor center and turn north onto service road; cross river and mine is approximately 5-6 miles north (see U.S. Atomic Energy Commission Preliminary Map No. 20).

AR 5 Evans Huskon No. 2, Yazzie No. 312
Operator: El Paso Natural Gas
El Paso, Texas 79940

Cameron Mining Co.
Salt Lake City, Utah 84101

Locating Directions: From Cameron, Arizona, take the first dirt road north of the Little Colorado River. Go approximately 1 1/2 miles south-east, then head off road directly east approximately 3/4 mile.

AR 6 Huskon 1
Operator: Cameron Mining Co.
Salt Lake City, Utah 84101

Locating Directions: From Cameron, Arizona, take first road north of the Little Colorado River. Head west approximately 1 mile; mine can be seen west of this point.

AR 7 Huskon 7, 8, 10, 11, 26
Operator: Cameron Mining Co.

Locating Directions: Four miles north of Gray Mountain, Arizona, take dirt road 6 miles east. Mines are located on the north, west, and south edges of the low mesa to the north of the road.

AR 8 Jack Huskon No. 3
Operator: Woodson Exploration Co.
Minneapolis, Minnesota 55401

Locating Directions: From Cameron, Arizona take the first road north of the Little Colorado River for approximately 7 miles. The mine is right before a wash and on the east side of the road (see U.S. Atomic Energy Commission Preliminary Map No. 40).

AR 9 Juan Horse No. 4

Operator: Steinberger Drilling Co.
Roswell, New Mexico 88201

Locating Directions: From Cameron, Arizona, take the first road north of the Little Colorado River for approximately 5 miles (see U.S. Atomic Energy Commission Preliminary Map No. 40).

AR 10 Julia Semallie, Emmet Lee No. 3

Operator: Mescalero Mining Corporation
Roswell, New Mexico 88201

Locating Directions: Take main road into Wupatki National Monument about 1/4 mile past visitor center; turn north on service road, cross river. Mine is about 4 miles north (see U.S. Atomic Energy Commission Preliminary Map No. 40).

AR 11 Monument 2

Operator: Vanadium Corporation of America

AR 12 Moonlight Mine

Operator: Industrial Uranium Corp.

AR 13 Ramco 20, 21, 22

Operator: Cameron Mining Co.

Locating Directions: From Cameron, Arizona, take the first dirt road just north of the Little Colorado River for approximately 13 miles.

NEW MEXICO (COAL)

Jones, D.
Gallup, New Mexico 87301

Contact - David Jones

NM 2 David Jones Mine
Operator: Santa Fe Railroad

Locating Directions: U.S. Hwy 66 (Frontage Road) 1.4 miles west past New Mexico Hwy 566; turn south under I-40 on dirt road and proceed to Amcoal #1 Mine. David Jones Mine is at southeast corner of the Amcoal #1 mine.

Kaiser Steel Co.
P.O. Box 1107
Raton, New Mexico 87740

Contact - E.D. Moore (Mine Manager)

NM 6 West York Strip
Surface and Subsurface Owner: Cherokee and Pittsburgh Coal Mining Co.

Pittsburgh and Midway Coal Mining Co.
P.O. Box "M"
Gallup, New Mexico 87301

Contact - Henry McCabe (Reclamation Technician)

NM 3 McKinley Mine
Surface Owner: Navajo Tribe
Subsurface Owners: USDI, Santa Fe Railroad,
and State of New Mexico.

Locating Directions: Take US Hwy 264 2 miles east of Window Rock, Arizona to dirt road leading north to the mine.

Riverside Cement Co.
Box 376
Fort Wingate, New Mexico 87316

Contact - Charles Scrivner (Safety Director)

NM 1 Amcoal #1
Surface Owner: Navajo Tribe
Subsurface Owner: Santa Fe Pacific Railroad Co.

Locating Directions: Take US Hwy 66 (Frontage Road)
1.4 miles west past New Mexico Hwy 566; turn
south under I-40 and take dirt road to
Amcoal #1.

Utah International
Box 155
Fruitland, New Mexico 87416

Contact - S.L. Hunter (Mine Superintendent)

NM 4 Navajo Mine
Surface and Subsurface Owner: Navajo Tribe

Western Coal Co.
P.O. Box 509
Farmington, New Mexico 87401

Contact - Duane Walker (Preparation Foreman)

NM 5 San Juan Pit
Surface Owner: Bureau of Land Management,
State of New Mexico, and Private.
Subsurface Owner: Federal, State and
Private.

NEW MEXICO (URANIUM)

Citrus County Land Bureau, Inc.

NM 11 Section 25 Mine
Operator: Reserve Oil and Minerals Corp.
Albuquerque, New Mexico 87102
Subsurface Owner: Santa Fe Railroad.

Reserve Oil and Minerals Corporation
908 Park Ave., SW
Albuquerque, New Mexico 87102

Contact - Arthur Miller

NM 10 Poison Canyon Mine
Surface Owner: Citrus County Land Bureau,
Inc.
Subsurface Owner: Santa Fe Railroad.

Locating Directions: From I-40, take New Mexico
Hwy 53 1.3 miles north of the McKinley/
Valencia County line; turn left (west)
on dirt road and follow signs to mine.

Roundy, Elbert
Bluewater, New Mexico 87005

NM 7 Farris (Section 9) Mine
Operator: Farris Mines
Grants, New Mexico 87020
Subsurface Owner: Mark Elkins

Locating Directions: From Milan, New Mexico, take
New Mexico Hwy 53 north to dirt road 3 miles
south of the McKinley/Valencia County line.
Take road east and bear left at first fork
in the road and continue about 2 miles up
into the hills.

The Anaconda Co.
P.O. Box 638
Grants, New Mexico 87020

Contact - Jack Reynolds (Reclamation Engineer)

NM 9 Jackpile - Paquate Mine
Surface and Subsurface Owner: Laguna
Indian Reservation.

Locating Directions: Take I-40 exit 114 west on
Frontage Road for 2 miles. Take New Mexico
Hwy 279 north 3 miles to road to mine.

Todilto Exploration and Development Co.
3810 Academy South, NE
Albuquerque, New Mexico 87109

NM 8 Haystack Mine
Surface Owner: Voltan Piejen
Bluewater, New Mexico 87005
Subsurface Owner: Santa Fe Railroad

Locating Directions: I-40 exit 66 north and take
Frontage Road 2 1/2 miles east to dirt road
leading north under RR tracks; bear right
(east) and follow road signs to the mine.

NORTHERN GREAT PLAINS REGION

COLORADO (COAL)

Coal Canyon, Inc.
P.O. Box 1501
Grand Junction, Colorado 81501

CO 6 Coal Canyon Strip Mine
Subsurface Owner: Federal

Locating Directions: From Grand Junction, Colorado,
take Colorado Hwy 6-24 north 15 miles.
Take Cameo Exit. Mine visible from highway,
adjacent to prominent thermal generating
plant.

Empire Energy Corporation

Contact - Steven South, Mine Engineer
Craig, Colorado 81625

CO 26 Williams Fork Strip

Energy Fuels Corporation: CO10, CO11, CO12

Contact - Bill Noud or Kent Crofts
Energy Fuels Corp.
Box G
Steamboat Springs, Colorado 80477

CO 10 Energy Mine No. 1

CO 11 Energy Mine No. 2

CO 12 Energy Mine No. 3
Subsurface owner: Mixed Federal and Energy
Fuels

Locating Directions: Take Colorado 131 12 miles south
of Oak Creek.

GEC Minerals: CO3, CO4, CO7, CO8, CO15

Contact - F. E. Snider
GEC Minerals
Tulsa, Oklahoma 74101

CO 3 Beer Strip South

Locating Directions: One mile north of GEC office.

CO 4 Beer Strip No. 2

Locating Directions: From Florence, Colorado, take Colorado Hwy 67 south for 5 miles; right at fork for 2.5 miles, left at fork for .7 miles.

CO 7 Corley S & A, NW

Subsurface Owner: Cherokee and Pittsburg
Mined '73 - '75: Canon Coal Corp.

CO 8 Corley S & A, SE

Locating Directions for CO7 and CO8: From Rockvale, Colorado take Fremont County Road 84 south for 2 miles.

CO 15 GEC Mines (Corley, Black Diamond Strips)

Surface and Subsurface Owners: Cherokee and Pittsburg and Corley Co.

Locating Directions: From Florence, Colorado, go 5 miles south on Colorado Hwy 67. Turn right at fork and go 3 miles.

Guillano, Louis: CO1, CO2

Contact/Owner - Louis Guillano
Florence, Colorado 81226

Contact - Nick Roccio, Operator

CO 1 Annex Strip No. 2 NE

CO 2 Annex Strip No. 2 SW

Locating Directions: Mines are 2 miles south of Rockvale, just west off gravel road.

Hitchins, Melvin: CO5, CO21

Contact - Melvin Hitchins
Steamboat Springs, Colorado 80477

CO 5 Black Dan Strip

Operator: Black Dan Coal Co.

CO 21 Osage Strip

Operator: Pittsburg and Midway Coal Co.

Locating Directions: From Milner, Colorado, take US
40 1 mile west then take gravel road 1 mile
south.

Kerr Coal Co.
Walden, Colorado 80480

Contact - Mark Kerr, Mine Manager

CO 17 Marr Strip No. 1

Moore, Mrs. Wilber
Ft. Collins, Colorado 80521

CO 18 Moore Mine
Operator: North Park Coal Co.

Locating Directions: Behind post office in Coalmont,
Colorado.

Park Coal Company

CO 16 Loma Park Strip
Subsurface Owner: Private

Peabody Coal Company: CO20, CO23, CO24
301 N. Memorial Drive
St. Louis, Missouri 63102

CO 20 Nucla Mine
Operator with Peabody Coal Co.:
San Miguel Power Assoc., Inc.
Nucla, Colorado 81424

CO 23 Seneca Strip No. 1
Owner/Operator with Peabody Coal Co.:
Seneca Coals Ltd.
Surface and Subsurface Owners: Mixed
Federal with many Private Owners

CO 24 Seneca Strip No. 2
Owners same as CO 23.

Pittsburg and Midway Coal Mining Co.
1720 South Bellair
Denver, Colorado 80201

Contact - Jim Hitt, Resident Mine Engineer

CO 9 Edna Mine
Subsurface Owner: Mixed Federal and Private

Locating Directions: From Steamboat, Springs,
Colorado, take Colorado Hwy 131 15 miles
south.

Union Pacific Railroad: CO13, CO14
(Rocky Mountain Energy Co.)
Denver, Colorado 80201

CO 13 Erie Strip
Operator: Erie Coal Co.

Locating Directions: North of Denver, Colorado exit
I-25 at Mineral Road, 1 mile west and 1 mile
north.

CO 14 Franceville Strip
Operator: Lee Gordley
Lessee (of pasture): H. L. Boucher

Locating Directions: From Colorado Springs, Colorado,
take Colorado Hwy 94 to Franceville Coal
Mine Road. Go 1.5 miles south. (One mile
southwest of Boucher ranch house).

Unknown Owner/Operator

CO 25 Superior Strip

Locating Directions: From Florence, Colorado, take
Colorado Hwy 67 5 miles south, turn right,
and go 3 miles. Mine runs parallel to road.

Walker, Glen: CO19, CO22
P.O. Box 15564
Phoenix, Arizona 85018

CO 19 Moore Strip
Operator: North Park Coal Co.
Lessee: Elmer Brinker

Locating Directions: Near Coalmont, Colorado.

CO 22 Rosebud Strip
Operator: Rosebud Coal Sales Co.
Denver, Colorado
Subsurface Owner: Federal

Locating Directions: One mile south of Coalmont,
Colorado.

COLORADO (URANIUM)

Union Carbide Corporation: CO27, CO28, CO29, CO30, CO31
Metals Division
P.O. Box 66
Maybell, Colorado 81640

Maybell Operations Surface and Subsurface Owners: Mixed
BLM and Private

CO 27 Maybell Operations-Gertrude Pit

CO 28 Maybell Operations-Johnson Pit

CO 29 Maybell Operations-Marge Pit

CO 30 Maybell Operations-Rob Rollo Pit

CO 31 Maybell Operations-Sage Buella Pit

Locating Directions: From Craig, Colorado, take
Colorado Hwy 40, 25 miles west. Follow signs
to mill.

MONTANA (COAL)

Bureau of Land Management

Contact - H.N. Tragitt
Soil Conservation Service
Roundup, Montana 59072

MT 10 Square Deal Mine

Operator: Square Deal Coal Co.
220 Seventh St. W.
Roundup, Montana 59072

Locating Directions: Take US 309 about 3 miles north-
west of Roundup, Montana.

Burlington Northern Railroad and BLM

Contact - West Boettger
Western Energy Co.
Colstrip, Montana 59323

MT 2 Burlington Northern Colstrip Mine

Locating Directions: Mine located directly east of
Colstrip, Montana.

Consolidated Coal Co.
Western Division
3300 One Oliver Plaza
Pittsburgh, Pennsylvania 15222

Contact - Frank Locash
Consolidated Coal
644 Grand Ave.
Billings, Montana 59102

MT 3 Consol Test Pit

Locating Directions: Five miles southeast of Roundup,
Montana (See Roundup, Montana USGS 1:250,000
topographic map).

Decker Coal Company and State of Montana

Contact - Dean Skalla, General Manager
Decker Coal Co.
P.O. Box 746
Sheridan, Wyoming 82801

MT 4 Decker Mine

Subsurface Owner: US Dept. of Interior,
BLM. Billings, Montana,
and State of Montana.

Divide Mining Co.

Contact - Jack or Victor Carlson
Roundup, Montana 59072

MT 5 Divide Mine

Knife River Coal Mining Co.

Contact - David Heskett, President
A. J. Wittmaier, Assistant Vice-President
Knife River Coal Mining Co.
1916 Kavane Drive
Bismark, North Dakota 58501

MT 9 Savage Mine

Subsurface Owner: Federal and Private.

Peabody Coal Co.
12075 E. 45th Ave.
Suite 203
Denver, Colorado 80239

Contact - Gene Tuma
Peabody Coal Co.
Colstrip, Montana 59323

MT 1 Big Sky Mine

Subsurface owner: BLM, Burlington Northern
Railroad

Locating Directions: From Colstrip, Montana, take
main road 6 miles south.

Pittsburg and Midway Coal Mining Co.

Contact - Paul or George Meged
PM Coal Mining Co.
Roundup, Montana 59072

MT 6 Pittsburg and Midway Mine

Western Energy Company

Contact - West Boettger
Western Energy Co.
Colstrip, Montana 59323

MT 7 Rosebud - Colstrip Mine
Surface Owner: Western Energy Co., leased
from BNR, BLM, State.

Locating Directions: Mine is located adjacent to
Colstrip, Montana.

Westmoreland Resources

Contact - David Simpson, Environmental Administrator
Westmoreland Resources
P.O. Box 449
Hardin, Montana 59034

MT 8 Sarpy Creek Mine (also called Absaloka Mine)
Subsurface Owner: Crow Tribe

MONTANA (PHOSPHATE)

Cominco Mining and BLM

Contact - Les Koon, Manager
Cominco Mining
Garrison, Montana 59731

MT 11 Anderson Mine
Operator: Montana Phosphate Products

Locating Directions: Near Garrison in Powell Co,
Montana. Go 6 miles north of Montana
Hwy 10 on east fork of Brock Creek.
Use USGS map for Garrison (15').

J. R. Simplot Co.
Boise, Idaho 83701

Contact - Bob Lothrop
Pocatello, Idaho 83201

MT 12 Centennial Mine
Subsurface Owner: BLM

Locating Directions: On Montana-Idaho border south
of Lakeview, Montana.

Montana, State of

Contact - Joe Murphy, Reclamation Division
State Land Department
Helena, Montana 59601

MT 13 Glacier Natural Products Mine
Operator: Glacier Natural Products Co.

Locating Directions: From Elliston, Montana, go
3 miles east on US 12. Mine is on north
side of Hwy.

NORTH DAKOTA (COAL)

Albrecht, M.
New England, North Dakota 58647

ND 1 Albrecht Mine
Operator: Albrecht Coal Co.

Baukol - Noonan Inc.: ND6, ND8, ND17, ND22, ND27
P.O. Box 248
Minot, North Dakota 58701

ND 6 Center Mine
Subsurface Owner: Private

ND 8 Columbus Mine
Operator: Consolidation Coal Co.
Englewood, Colorado
Surface and Subsurface Owners:
Baukol-Noonan Inc. and numerous
private owners.

ND 17 Holte Mine
Operator: Holte Coal Co.

ND 22 Kostek Mine
Operator: Kostek Coal Co.

ND 27 Noonan Mine
Subsurface Owners: Private

Bornemann, M.

Contact - M. Bornemann
Rt. 1, Box 12
Center, North Dakota 58530

ND 29 Olin Mine
Operator: Olin Coal Mine Co.

Locating Directions: From Center, North Dakota, take
North Dakota Hwy 25, 2 miles west, then turn
north on dirt road for 1 mile. Mine is on
west side of road.

Buechler, C.: ND32, ND48

Contact - Carl Buechler
Sawyer, North Dakota 58781

ND 32 Quality Lignite Mine
Operator: Quality Lignite Mine Co.

Locating Directions: From Minot, North Dakota take North Dakota Hwy 83 for 18 miles south to county Hwy 20. Head east 8 miles. Mine is on south side of road.

ND 48 Vix Mine
Operator: Valley Coal Co. (now owned by Consolidation Coal Co.)

Locating Directions: From Minot, North Dakota take North Dakota Hwy 83 south for 18 miles to County Hwy 20. Head east 7 1/2 miles then turn south on dirt road for 3/4 mile.

Burlington Northern Railroad: ND7, ND31
Miles City, Montana 59301

ND 7 Coffin Butte Coal Mine
Operator: Coffin Butte Coal Co.

Lessee: Reimhold Dietz
New Leipzig, North Dakota 58562

ND 31 Perzinski Mine
Operator: Perzinski Mine Co.

Consolidation Coal Co.: ND4, ND9, ND15, ND25, ND47
Bismarck, North Dakota 58501

ND 4 Blank Bros. Mine
Operator: Blank Bros. Mine Co.

Contact - Jerry Kirchmier, Land Manager
Consolidation Coal Co.
Bismarck, North Dakota 58501

ND 9 Custer Mine

Surface Lessee: State of North Dakota

Locating Directions: Take North Dakota Hwy 200 from US 83 west across the Sakakawea Dam. Mine is on west side of road just before the Garrison, North Dakota turn off.

ND 15 Glenharold Pit

Subsurface Owners: Private

ND 25 Miller Mine
Operator: Miller Coal Co.

ND 47 Velva Mine
Subsurface Owners: Consolidation Coal Co.,
Northwest Linen Co., and Private Owners.

Davenport, K.

Contact - K. Davenport
New Leipzig, North Dakota 58562

ND 10 Davenport Mine
Operator: Davenport Coal Mine Co.

Locating Directions: One mile Northeast of New
Leipzig.

Ecklund, M.

Contact - Melvin C. Ecklund
Bismarck, North Dakota 58501

ND 11 Ecklund Mine
Operator: Ecklund Mine Co.

Locating Directions: Go 2.4 miles east of US Hwy 83
on North Dakota Hwy 36. Mine is on north
side of road.

Ellison, O.
Emmet, North Dakota 58534

ND 5 Burns and Wretling Mine
Operator: Burns and Wretling Coal Co.

Erickson, D.

Contact - D. Erickson
Parshall, North Dakota 58770

ND 44 Superior Mine
Operator: Superior Coal Mine Co.

Locating Directions: Five miles west of junction
North Dakota Hwys 8 and 23, then north
3/4 mile. Mine is on west side of road.

Husky Industries Inc.
Drawer I
Dickinson, North Dakota 58601

ND 18 Husky Mine
Subsurface Owner: Burlington Northern Inc.
St. Paul, Minnesota

Ihle, A.

Contact - Anthony Ihle
Hettinger, North Dakota 58639

ND 19 Ihle Coal Mine
Operator: Jacob Ihle

Locating Directions: 1 mile east of junction North
Dakota Hwys 8 and 12, then head north
1 mile; mine is on east side of road.

Jensen, A.

ND 21 Jensen Mine
Operator: Jensen Coal Mine

Johnson, A.

Contact - Art Johnson
Watford City, North Dakota 58854

ND 39 Skogheim's Mine
Operator: Skogheim's Mine

Locating Directions: Go 12 miles north of cemetery
east of Watford City, North Dakota, on
North Dakota Hwy 23, then head 1 mile east.

Knife River Coal Mining Company: ND3, ND14
P.O. Box 915
Bismarck, North Dakota 58501

ND 3 Beulah (North and South)
Subsurface Owners: Federal and Private.

Contact - Terry Uhler (Reclamation Specialist)
Knife River Coal Co.
Gascoyne, North Dakota 58629

ND 14 Gascoyne (Peerless) Mine
Subsurface Owners: Knife River Coal Co.,
Federal, and Private.

Locating Directions: Two miles east of Gascoyne,
North Dakota, on US Hwy 12.

Koush, A.
Bismarck, North Dakota 58501

ND 50 Wilton Mine
Operator: Truax-Traer (now owned by
Consolidation Coal Co.)

Krause, S.

ND 23 Krause Mine
Operator: Krause Coal Mine

Meyers, J. (Estate)

Contact - Wayne Williamson
Parshall, North Dakota 58770

ND 24 Landaker Mine
Operator: Landaker Coal Mine

Locating Directions: From the junction of North
Dakota Hwys 23 and 37, head north 3 miles,
turn west 2.5 miles then northwest
2.6 miles. Head north 1 mile, then west
1 mile further.

Miller, D.
Underwood, North Dakota 58576

ND 46 Underwood Mine
Operator: Underwood Coal Mine

North American Coal Corporation
Lignite Division
P.O. Box 1916
Bismarck, North Dakota 58501

ND 20 Indian Head Mine
Subsurface Owner: North American Coal Corp.

Olson, C.

Contact - Carl Olson
Williston, North Dakota 58801

ND 42 Square Deal Mine
Operator: Square Deal Coal Co.

Locating Direction: From Williston, take North Dakota Hwy 1804 west, to second right, past the salt plant (between mile markers 316 and 315) and follow dirt road 2.8 miles.

Papke, D.

Contact - Darrel Papke
Hettinger, North Dakota 58639

ND 2 Arrowhead Mine (Olson, Smith & Ullman Mine)
Operator: N.L. Industries Inc.
Belle Fourche, South Dakota

Locating Directions: 1 mile east of junction North Dakota Hwys 12 and 8.

Pederson, O.
Watford City, North Dakota 58854

ND 30 Pederson Mine
Operator: Pederson Coal Mine

Rafferty, S. (Estate)

Contact - Mrs. Stanley Rafferty
Rt. 111
New England, North Dakota 58647

ND 16 Havelock Mine
Operator: Havelock Fuel Co.

Locating Directions: From New England, take North Dakota Hwy 22, 3 miles south. Then take dirt road 6 miles east to grain elevator. Head south 1/2 mile.

Richter, J.

ND 34 Richter Mine
Operator: Richter Coal Mine

Schorsch, E.: ND26, ND35

Contact - Elizabeth Schorsch
New England, North Dakota 58647

ND 26 New England Mine
Operator: New England Coal Mine

Locating Directions: From New England, North Dakota
take North Dakota Hwy 22, 3 miles south.
Then take dirt road 6 1/2 miles east
(1/2 mile east past grain elevator).

ND 35 Schorsch Mine
Operator: Schorsch Mine Co.

Shank, E.
Center, North Dakota 58530

ND 36 Shank Mine

Locating Directions: 3 miles east of Center, North
Dakota on North Dakota Hwy 25. Then 3 miles
south on dirt road. Mine is on east side of
road.

Shelley, R.

Contact - R. Shelley
Watford City, North Dakota 58854

ND 37 Shelley Mine
Operator: Shelley Coal Mine

Locating Directions: Just east of Watford City, North
Dakota, on North Dakota 23, take dirt road
next to truck stop 10 miles north. Then
head east 1 mile.

Sorenson, R.: ND12, ND13
Emmet, North Dakota 58534

ND 12 Garrison Mine
Operator: Garrison Coal Co.

ND 13 Garrison Lignite Co. Mine
Operator: Garrison Lignite Co.

Spitzer, A.

ND 40 Spitzer Mine
Operator: Spitzer Coal Mine Co.

Sprecher Coal Mine Co.

ND 41 Sprecher Coal Mine
Subsurface Owner: Private

Stringer, G.

ND 38 S&L Mine (Sirra Mine - pre 1949)
Operator: Sirra Coal Mine Co.

Tveter, J.

Columbus, N.D. 58727

ND 45 Tveter Bros. Mine
Operator: Tveter Bros. Coal Mine

Waggoner, R.

Contact - Robert Waggoner
Regent, North Dakota 58650

ND 33 Regent Mine
Operator: Regent Coal Mine

Locating Directions: Three miles west of Regent on
North Dakota Hwy 21. Then 1 mile north on
dirt road, mine is 1/4 mile west.

Watson, H.A.: ND43, ND49

ND 43 Stelter Mine
Operator: Stelter Coal Mine

ND 49 Watson Mine
Operator: Watson Coal Mine

Williamson, W.

Contact - Wayne Williamson
Parshall, North Dakota 58770

ND 29 Parshall Mine
Operator: Parshall Coal Co.

Locating Directions: One mile south of Parshall,
North Dakota on North Dakota Hwy 37.
Mine is 1/4 mile east.

NORTH DAKOTA (URANIUM)

Frank, M.

Contact - Ted Frank
Belfield, North Dakota 58622

ND 52 Frank Mine
Operator: Union Carbide Corp.

Locating Directions: Six miles north of Belfield,
then 1.5 miles west. Pit is on south side
of the road.

Fritz, L.

Contact - Lester Fritz
Belfield, North Dakota 58622

ND 51 Church 1
Operator: Susquehanna Western

Locating Directions: Take US 85, 17 miles south of
Belfield, then 4 miles west to Fritz Ranch.
Then head south 1 mile.

Hurick, J.

ND 53 Hurick #1
Operator: Susquehanna Western

Klym, W.

Contact - William Klym
Rt 1, Box 39
Dickinson, North Dakota 58601

ND 54 Klym Mine
Operator: Susquehanna Western

Locating Directions: Go 13 miles north of Belfield,
North Dakota on North Dakota Hwy 85 (between
mile markers 89 & 90). Mine is 1/4 mile
east.

Luptak, A.

ND 55 Luptak Mine
Operator: Union Carbide Corp.

Schwartz, W.

Contact - W. Schwartz
P.O. Box 718
Winchester, Oregon 97495

ND 56 Section 2 Mine
Operator: Georesources Inc.

Locating Directions: Go 14 miles south of Belfield,
North Dakota on North Dakota Hwy 85 (between
mile markers 62 & 63). Then west 4 miles.

Talkington, H.

Contact - H. Talkington
Belfield, North Dakota 58622

ND 57 Talkington Mine
Operator: Union Carbide Corp.

Locating Directions: From Belfield, North Dakota,
4 miles west, 5 miles north, then 3/4 mile
west. Mine is on south side of road just
before a fork in the road. (A backfilled
government pit is across the road.)

SOUTH DAKOTA (COAL)

Johnson, W.

Contact - Walter Johnson
Firesteel, South Dakota 57628

SD 1 Firesteel Mine
Operator: Runkel Coal Co.
Dewey County Coal Company
Subsurface Owners: Numerous Private Owners

Locating Directions: Just west of Firesteel, South
Dakota.

SOUTH DAKOTA (URANIUM)

Crevier, C.

Contact - Chester Crevier
Bowman, North Dakota 58623

SD 5 Flat Top Group
Operator: Kermac Nuclear Fuels

Locating Directions: Approximately 1/2 mile northeast
of Ludlow, South Dakota.

Darrow, E.
Edgemont, South Dakota 57735

SD 4 Darrow Lease
Operator: Susquehanna Western

Federal US Forest Service: SD 3, SD 6, SD 8, SD 10, SD 11,
SD 12, SD 13, SD 14, SD 15

SD 3 Crazy Group
Operator: Susquehanna Western

SD 6 Freezout Mine
Operator: Susquehanna Western

Locating Directions: Take Fall River County Hwy 10,
1 mile south of Custer/Fall River County
line. Then turn northeast through Spencer
Ranch to fork in road. Head east about
1 mile (right).

SD 8 Holdup #5 Mine

Operator: Susquehanna Western

SD 10 Pickpocket Mine

Operator: Sundance Petroleum & Uranium Co.

Locating Directions: Four miles west of Ludlow, South Dakota, in Custer National Forest, 1 mile southeast of Riley Pass.

SD 11 Relf Group

Operator: Kermac Nuclear Fuels

Locating Directions: Go 4 1/2 miles west of Ludlow, South Dakota in Custer National Forest, 1 mile south-southeast of Riley Pass

SD 12 Riley Group

Operator: Kermac Nuclear Fuels

Locating Directions: Five miles west of Ludlow, South Dakota in Custer National Forest, 3/4 mile NW of Riley Pass.

SD 13 Rowena Pit

Operator: Susquehanna Western

Locating Directions: From Edgemont, South Dakota, take Fall River County Hwy 10 for approximately 3 miles then take north fork in the road for 4.5 miles. Mine is on west side of road.

SD 14 Section 19, 20 and 30 Pits

Operator: Numerous

Locating Directions: From US Hwy 18 near Edgemont South Dakota, take Red Canyon road 9 miles north. Then take dirt road 3/4 mile west through the Hey Ranch.

SD 15 Snake Eye & Billy Dale

Operator: Kermac Nuclear Fuels

Locating Directions: 3 1/3 miles west of Ludlow, South Dakota in National Forest, 1 1/2 miles east-southeast of Riley Pass.

Hey, G.

Contact - G. Hey
Edgemont, South Dakota 57735

SD 7 Hey and Fey Mine
Operator: Emmet Isaacs

Locating Directions: Take Red Canyon Road 9 miles
north of US Hwy 18 near Edgemont, South
Dakota. Mine is located on Hey Ranch.

Spencer, D.

Contact - Donald Spencer
Edgemont, South Dakota 57735

SD 2 Bud-Lucky Bud
Operator: Susquehanna Western

Locating Directions: Take Fall River County Hwy 10
to 1 mile south of Custer/Fall River County
line and turn northeast through Spencer
Ranch to north fork in road. Mine is
1/4 mile north.

Unknown Owner and Operator

SD 9 Lion - McKnight
T8S R3E-S12

WYOMING (COAL)

Amax Coal Co.
P.O. Box 1880
Gillette, Wyoming 82716

Contact - Mr. Randall Shinn, Reclamation Supervisor

WY 1 Belle Ayr Mine

Locating Directions: From Gillette, Wyoming, take US
Hwy 59 approx. 25 miles south.

Anchut Land and Cattle Company
Denver, Colorado 80201

WY 10 Elk Mountain Strips (Upper Sand Creek)
Operator: Elk Mountain Coal Company
Subsurface Owner: Commonwealth Edison,
Chicago

Locating Directions: From intersection with I-80 take
Wyoming Hwy 72 1 mile north to dirt road.
Head east on dirt road for approx. 1 mile.

Arch Mineral Corporation: WY13, WY28, WY29
Box 459
Hanna, Wyoming 82327

Contact - Ted Forney

WY 13 Hanna No. 1 (Monolith Pit)
Operator: Rosebud Coal Company

Locating Directions: From Hanna, Wyoming take Carbon
County Highway 291. Mine is approx. 1 mile
northeast.

Contact - Gene Garbaugh

WY 28 Seminole No. 1
Surface Owner: BLM and Palm Livestock
Subsurface Owner: BLM and Rocky Mountain
Energy

Contact - Bob Wunderlich, Mine Superintendent

WY 29 Seminole No. 2
Surface Owner: BLM and Palm Livestock
Subsurface Owner: BLM and Rocky Mountain
Energy

Ash Creek Mining Co. (Public Service Co. of Okla.)

Contact - Jim Carroll
Ash Creek Mining Co.
Sheridan, Wyoming 82801

WY 19 PSO Mine No. 1 (Public Service Co. of Oklahoma)

Locating Directions: From Wyoming Hwy 338 north of
where it crosses the Tongue River, take Ash
Creek Road northwest 3 miles.

Big Horn Coal Co.: WY6, WY18, WY33

Contact - Sam Scott, Reclamation Engineer
PKS Mining Co.
P.O. Box 746
Sheridan, Wyoming 82801

WY 6 Brown and Williams

WY 18 Plancheck Pit

WY 33 Zowada Pit

Locating Directions for WY6, WY18, and WY33: From
Acme, Wyoming WY6 is 1/2 mile northeast and
WY18 and WY33 are 1 mile south.

Bridger Coal Co.
P.O. Box 1688
Rock Springs, Wyoming 82901

WY 14 Jim Bridger Mine

Colowyo Coal Co.
1726 Champ St.
Denver, Colorado 80202

Contact - O. F. Lewis, President

WY 7 Colowyo No. 1 & 2

Locating Directions: From Mountain View Cemetery in
Rock Springs, Wyoming, go 1 mile south.
(Use Rock Springs USGS Map.)

Energy Development Co.: WY2, WY21, WY22, WY23, WY24, WY25, WY30

Contact - Don Hartley, Reclamation Supervisor
Energy Development Co.
P.O. Box 36
Hanna, Wyoming 82327

WY 2 Big Ditch Pit
Surface and Subsurface Owner: BLM

Locating Directions: From Hanna, Wyoming take main
road on north side of town. Go 7 miles
west. (Use Dana, Wyoming 7 1/2' USGS Map.)

WY 21 Rimrock Pits No. 1

WY 22 Rimrock Pits No. 2
Surface and Subsurface Owner: BLM

Locating Directions: From Hanna, Wyoming take main
road on north side of town. Go 5 miles
northeast (Use Tenmile Spring USGS map.)

WY 23 Rimrock Pits 3 through 7
Surface and Subsurface Owner: BLM and USGS.

WY 24 Rimrock Pits - Section 5

WY 25 Rimrock Pits - Section 7
Surface Owner: Palm Livestock (Elk
Mountain, Wyoming)
Subsurface Owner: Rocky Mountain Energy

WY 30 Union Pacific No. 1
Surface and Subsurface Owner: Union Pacific
Railroad

Locating Directions for WY 30: From Hanna, Wyoming,
take dirt road west for 3 miles.

Federal: WY4, WY5

Contact - Sam Scott, Reclamation Engineer
PKS Mining
P.O. Box 746
Sheridan, Wyoming 82801

WY 4 Big Horn Hidden Valley Section 36 East Mine
Operator: Big Horn Coal Co.

WY 5 Big Horn Hidden Valley Section 36 West Mine
Operator: Big Horn Coal Co.

Locating Directions for WY4 and WY5: From Ranchester, Wyoming, take US 14 4 miles east. Then take dirt road 2 to 3 miles north. Mines are near road.

Kemmerer Coal Co.

Contact - Louis A. Engstrom, Reclamation Engineer
The Kemmerer Coal Co.
Frontier, Wyoming 83121

WY 11 Elkol-Sorensen Mine

Locating Directions: West of Kemmerer, Wyoming on US 30.

Medicine Bow Coal Co.
Arch Mineral Corp.
P.O. Box R
Hanna, Wyoming 82327

WY 15 Medicine Bow Mine

Surface Owner: Federal and Palm Livestock
Subsurface Owner: Federal and Rocky Mountain Energy

Pacific Power and Light Co.: WY8, WY9

Contact - Neil Harrington
Pacific Power and Light Co.
P.O. Box 720
Casper, Wyoming 82602

WY 8 Dave Johnston Mine

Surface Owner: Federal
Subsurface Owner: Federal

Locating Directions: Go through power plant gate in Glenrock, Wyoming and follow R.R. tracks 20 miles northwest.

WY 9 East Antelope Mine

Operator: Best Coal Co.
Subsurface Owner: Gulf Oil and Minerals

Locating Directions: From the Converse-Campbell County Line take Hwy 59 5 miles south. Head east on County Hwy 37 for 6 miles.

Rocky Mountain Energy
544 Broadway
Rock Springs, Wyoming 82901

WY 20 Reliance Mines
Surface Owner: Private
Subsurface Owner: Rocky Mountain Energy

Locating Directions: From Rock Springs, Wyoming take
US Rt 167 north 2 1/2 miles. Turn east onto
dirt road. Mine is about 3 1/2 miles north-
east.

Rosebud Coal Co.: WY16, WY17, WY26, WY27

Contact - Dave Evans, Reclamation Supervisor
Rosebud Coal Co.
P.O. Box 98
Hanna, Wyoming 82327

WY 16 Nugget Pits 1 and 5

Locating Directions: From Hanna, Wyoming take main
road northeast approx. 2.5 miles to Rosebud
Coal Co. Sales office.

WY 17 Nugget Pit No. 2

Locating Directions: From Elmo, Wyoming, take main
road 1/4 mile east

WY 26 Rosebud Pits Nos. 1 & 2

Locating Directions: From Hanna, Wyoming, cross RR
bridge on north side of town and head west
approx. 1 mile.

WY 27 Rosebud Pits 4 - 15 (4S, 4N, 5, 6, 7, 8, 9, 10)

Locating Directions: From Hanna, Wyoming, take main
road northeast for approx. 2.5 miles to
Rosebud Coal Co. Sales office.

Sweetwater Resources, Inc.

Contact - Bob Graham, Liason Supervisor
Sweetwater Resources, Inc.
Rock Springs, Wyoming 82901

WY 12 Gunn Quealy No. 1 Mine

Owner: Sweetwater Resources, Inc.
(Subsidiary of Monsanto)

Locating Directions: From Rock Springs, Wyoming, take
Blairtown Rd. to Quealy, Wyoming to gain
admission. (Use Rock Springs USGS Map.)

Welch, William F.

Contact - William F. Welch,
P.O. Box 1066
Sheridan, Wyoming 82801

WY 31 Welch Mine

Locating Directions: From Ranchester, Wyoming, take
US 14 4 miles west to a dirt road. Go
south over the Tongue River, then head west
1 mile to mine.

Wyodak Resources Development Corp.

Contact - Jim Williams
Wyodak Resources Development Corp.
P.O. Box 149
Gillette, Wyoming 82716

WY 32 Wyodak Mine

Locating Directions: From Gillette, Wyoming take US
Hwy 14/16 approx. 6 miles east.

Wyoming, State of

Contact - Sam Scott, Reclamation Engineer
PKS Mining
P.O. Box 746
Sheridan, Wyoming 82801

WY 3 Big Horn Hidden Valley Section 1 Mine
Operator: Big Horn Coal Co.

WYOMING (URANIUM)

Exxon Corporation

Contact - Jim Shannon
Highland Mine
P.O. Box 3020
Casper, Wyoming 82602

WY 46 Highland Mine

Federal American Partners: WY34, WY39, WY41, WY48, WY49, WY62,
WY71

Contact - Bob Peel, Environmental Engineer

Federal American Partners
520 E. Main
Gas Hills Rt.
Riverton, Wyoming 82501

WY 34 Andria Group

WY 39 Buss Russ
Surface Owner: BLM
Subsurface Owner: Federal American Partners

WY 41 Clyde-Bret-Loco

WY 48 Jay Group

WY 49 John Gunnel

WY 62 Sagebrush - Tablestakes Mines

WY 71 Veca pits

Locating Directions: For Federal American Partners
Mill: From east end of Wyoming Hwy 136,
take dirt road south. Follow signs to mill.

Great Basin Petroleum Co.

WY 67 T33N R89W
Subsurface Owner: State of Wyoming

Homestake Mining Co.: WY47, WY56

Intermountain Bldg. No. 218
200 N. Wolcott
Casper, Wyoming 82601

WY 47 Homestake Nos. 1-4
Subsurface Owner: Geo Resources Corp.

WY 56 New Haven Group

Hornbuckle, Richard

Contact - Richard Hornbuckle
Glenrock, Wyoming 82637

WY 65 Spook Mine
Operator: Western Nuclear, Inc.

Locating Directions: From Junction of Wyoming Hwys
95 & 93, go 1/4 mile NW. Take Ross Road to
the Hornbuckle Ranch. Watch for sign on
east side of road.) The mine is north of
the Hornbuckle residence.

Kerr McGee Nuclear Corporation: WY36, WY63, WY66
508 N. Fenway
Casper, Wyoming 82602

Contact - Roy Baker
Glenrock, Wyoming 82637

WY 36 Betty Lou Group
Owner: Roy Baker

WY 63 Section 16 Mine
Surface Owner: William Reynolds
Glenrock, Wyoming 82637
Subsurface Owner: State of Wyoming

Locating Directions for WY36 and WY63: From the
Junction of Wyoming Hwy 95 and 93, take
Ross Road to the Baker Ranch. (Turn off
at sign for Hornbuckle Ranch.)

WY 66 Sullivan Mine
Owner: Kerr McGee Corp.

Lucky Mc Uranium Corporation: WY43, WY45, WY50, WY51, WY52,
WY53, WY54, WY55, WY60, and WY61.

Contact - Lee Nugent, Mine Manager
Lucky Mc Mine
P.O. Box 831
Riverton, Wyoming 82501

WY 43 Frazier Lomac Group
Surface Owner: BLM
Subsurface Owner: Wester Nuclear, Inc.

WY 45 Green River Claims
Surface Owner: BLM
Subsurface Owner: Natural Resources and
Development Lander,
Wyoming 82520

WY 50 Lucky Mc Group Dump No. 1
Owner: BLM

WY 51 Lucky Mc Group

WY 52 Lucky Mc Group Project 4 Spoils
Owner: BLM

WY 53 Lucky Mc Group Project 6 Spoils
Owner: BLM

WY 54 Lucky Mc Group Project 7 Spoils

WY 60 Rex Claims
Surface Owner: BLM
Subsurface owner: Lucky Mc Uranium Corp.

WY 61 Rim Group
Owner: BLM

Locating Directions for the above: All mines are
located near the Lucky Mc Uranium Mill in
Gas Hills, Wyoming. Take Wyoming Hwy 136
to Gas Hills, then follow signs to Lucky
Mc Office.

Contact - John Russell, Mine Manager
Shirley Basin Mine
Riverton, Wyoming 82501

WY 55 Shirley Basin Mines

Mullen Mining Company
Mills, Wyoming 82644

WY 72 Walker Leare
Owner: Kerr McGee Corp.
Glenrock, Wyoming 82637

Petrotomics (Getty Oil): WY44, WY58

Contact - Mike Franko, Environmental Engineer
P.O. Box 2509
Shirley Basin, Wyoming 82615

WY 44 Getty Oil Mine

WY 58 Petrotonics

Locating Directions for WY44 and WY58: North of
Shirley Basin townsite, take Wyoming Hwy 75
to Getty Oil Gate A.

Trace Elements Corporation

WY 40 Cedar Hills - Jack Rabbit

Union Carbide Mines: WY69, WY70

Contact - Karl Lambertson
P.O. Box 1500
Gas Hills Station
Riverton, Wyoming 82501

WY 69 East Gas Hills

WY 70 West Gas Hills
Owner: Union Carbide Corp.

Locating Directions to Union Carbide Office: Follow
signs from eastern end of Wyo Hwy 136.

Unknown Owner and Operator:

WY 68 T43N R75W

Urangesellschaft MHB & Co.
Denver, Colorado 80201

WY 59 Poison Basin

Western Nuclear, Inc: WY35, WY37, WY38, WY42, WY57, WY64

Contact - Don Sparling, Resident Manager
P.O. Box 340
Jeffrey City, Wyoming 82310

WY 35 Arrowhead Group
Owner: Western Nuclear, Inc.

WY 37 Bountiful Nos. 1, 9, and 10

Locating Directions for WY37: Take Wyoming Hwy 136 to Gas Hills and follow signs to Federal American Partners Mills. Continue on dirt road approx. 8 miles. Mine is on northwest side of road.

WY 38 Bullrush Group

Locating Directions: From eastern end of Wyo Hwy 136 take dirt road approx. 1 mile southwest.

WY 42 Day Loma

Locating Directions: 5 miles beyond WY 37 on same road.

WY 57 Pay Dirt

Locating Directions: From Jeffrey City, Wyoming take a dirt road 7 miles south of Wyoming Hwy 287. Mine is on east side of road.

WY 64 Sno - Bell and Mc Intosh Lease

Locating Directions: From Jeffrey City, Wyoming go 8 miles south of Wyo Hwy 287.

WYOMING (PHOSPHATE)

Stauffer Chemical Company
Leefe, Wyoming

Contact - Doneal Hymus, Mine Manager

WY 73 Leefe Mine

INTERMOUNTAIN REGION

IDAHO (PHOSPHATE)

Beker Industries: ID5, ID7, ID8
P.O. Box 37
Conda, Idaho 83230

Contact - Mr. Don Smedley, Plant Manager
Beker Industries
Conda, Idaho 83230

ID 5 Georgetown Canyon
Surface Owner: Federal
Subsurface Owner: Private

Locating Directions: Plant office located 4 miles
north of Soda Springs, Idaho on Idaho
Hwy 34.

ID 7 Maybe Canyon Mine
Subsurface Owner: Federal

Locating Directions: Same as ID 5.

ID 8 Mountain Fuel Mine
Operator: Mountain Fuel Co.

Locating Directions: Same as ID 5 and ID 7.

Idaho Fish and Game Dept.

ID 9 Waterloo Mine
Operator: Stauffer Chemical Co.
Star Route
Randolph, Utah 84064

J. R. Simplot Company: ID2, ID4

Contact - Robert Lothrop
J. R. Simplot Co.
Soda Springs, Idaho 83276

ID 2 Conda Mine
Subsurface Owner: Federal and Private

Locating Directions: On Idaho Hwy 34, 4 miles north
of Soda Springs, Idaho.

ID 4 Gay Mine
Subsurface Owner: Fort Hall Indian Reservation.

Locating Directions: Take I-15 north from Pocatello to the Fort Hall Indian Reservation, then east 5 miles.

Monsanto Chemical Co.: ID 1, ID 6
P.O. Box 816
Soda Springs, Idaho 83276

Contact - Ron Ferrel

ID 1 Ballard Mine
Operator: Monsanto Chemical Co.
Subsurface Owner: Federal

Locating Directions: Plant office located 4 miles north of Soda Springs, Idaho on Hwy 34.

ID 6 Henry Mine
Subsurface Owners: Federal and State

Locating Directions: Same as ID 1.

Stauffer Chemical Co.: ID3, ID10
Star Route
Randolph, Utah 84064

ID 3 Diamond Gulch Mine
Subsurface Owner: Federal

ID 10 Wooly Valley Mine

UTAH (PHOSPHATE)

Bradley Estates Inc.
c/o Robert S. Bradley
28 State St.
Boston, Massachusetts 02109

UT 1 Bradley Properties

Food Machinery Chemical Corp.

Contact - R. Conroy, Mineral Development Manager
Food Machinery Chemical Corp.
Mineral Products Division
P.O. Box 411
Pocatello, Idaho 83201

UT 2 FMC Properties

Operator: Stauffer Chemical Co.
Star Route
Randolph, Utah 84064

Stauffer Chemical Company: UT3, UT4

Contact - Doneal Hymus, Mine Manager
Stauffer Chemical Co.
Leefer, Wyoming

UT 3 Rex Peak - Brazier Canyon Properties
Subsurface Owner: Food Machinery Chemical
Corp.

UT 4 Vernal Mine

FAR WESTERN REGION

OREGON (URANIUM)

Western Nuclear Inc.

Contact - Mr. Nate Salo
Western Nuclear Inc.
Denver, Colorado 80202

OR 1 White King
Subsurface Owners: Private

WASHINGTON (COAL)

Washington Irrigation and Development Co.
Contact - John Wisch, Reclamation Manager
1015 Big Hanaford Road
Centralia, Washington 98531

WA 1 Centralia Coal Mine
Surface Owners: Pacific Power and Light Co.
Portland, Oregon 97208
Washington Water Power Co.
Spokane, Washington 99210
Subsurface Owners: Private

Locating Directions: 6 miles Northeast of Centralia,
Washington.

WASHINGTON (URANIUM)

Dawn Mining Company
P.O. Box 25
Ford, Washington 99013

WA 2 Midnight - Boyd Lease
Surface and Subsurface Owners: Spokane
Indian Tribe and individual owners.

Western Nuclear Inc.
Spokane, Washington 99210

WA 3 Sherwood Mine
Subsurface Owners: Spokane Indian Tribe.

APPENDIX B

List of Common Names, and Associated
Scientific Names, of Plant Species
Referred to in the Tables

Common Name	Scientific Name
alfalfa	<u>Medicago sativa</u> L.
alkali sacaton	<u>Sporobolus airoides</u> (Torr.) Torr.
Alta fescue	<u>Festuca arundinacea</u> Schreb.
American wormwood	<u>Artemisia absinthium</u> L.
antelope bitterbrush	<u>Purshia tridentata</u> (Pursh) DC.
Arizona fescue	<u>Festuca arizonica</u> Vasey
Arkansas rose	<u>Rosa arkansana</u> Porter
arrowhead	<u>Sagittaria</u> L.
aspen	<u>Populus</u> L.
balsamroot	<u>Balsamorhiza</u> Hook.
barley	<u>Hordeum</u> L.
basin rye	<u>Elymus cinereus</u> Scribn. + Merr.
bearded wheatgrass	<u>Agropyron subsecundum</u> (Link) Hitchc.
bee spiderflower	<u>Cleome serrulata</u> Pursh
big bluestem	<u>Andropogon gerardii</u> Vitman
big sagebrush	<u>Artemisia tridentata</u> Nutt.
bitterbrush	<u>Purshia</u> DC.
black greasewood	<u>Sarcobatus vermiculatus</u> (Hott.) Torr.
black willow	<u>Salix nigra</u> L.
blackberry	<u>Rubus</u> L.
blackbrush	<u>Coleogyne ramosissima</u> Torr.
blazing star	<u>Mentzelia</u> L.
blue grama	<u>Bouteloua gracilis</u> (H.B.K.) Steud.
blue spruce	<u>Picea pungens</u> Engelm.
bluebunch wheatgrass	<u>Agropyron spicatum</u> (Pursh) Scribn. + Smith
bluegrass	<u>Poa</u> L.
bottlebrush squirreltail	<u>Sitanion hystrix</u> (Nutt.) J.G. Sm.
boxelder	<u>Acer negundo</u> L.
brome	<u>Bromus</u> L.
buffalograss	<u>Buchloe dactyloides</u> (Nutt.) Engelm.
bull thistle	<u>Cirsium arvense</u> (L.) Scop.
bulrush	<u>Scirpus</u> L.
bur oak	<u>Quercus macrocarpa</u> Michx.
bursage	<u>Franseria dumosa</u> Grag.
Canada bluegrass	<u>Poa compressa</u> L.
canary reedgrass	<u>Phalaris arundinacea</u> L.
caragana	<u>Caragana arborescens</u>
cattail	<u>Typha</u> L.
ceanothus	<u>Ceanothus</u> L.
cheatgrass brome	<u>Bromus tectorum</u> L.
cherry	<u>Prunus</u> L.
chokecherry	<u>Prunus virginiana</u> L.
cholla	<u>Opuntia</u> Mill.
cocklebur	<u>Xanthium</u> L.
common reed	<u>Phragmites communis</u> Trin.

Common Name	Scientific Name
common sunflower	<u>Helianthus annuus</u> L.
cordgrass	<u>Spartina</u> ~~Schreb.~~
cottonwood	<u>Populus</u> L.
creeping juniper	<u>Juniperus horizontalis</u> Moench
creosotebush	<u>Larrea tridentata</u> (DC.) Cov.
crested wheatgrass	<u>Agropyron cristatum</u> (L.) Gaertn.
crown vetch	<u>Coronilla varia</u> L.
curlycup gumweed	<u>Grindelia squarrosa</u> (Pursh) Dunal
desert saltbush	<u>Atriplex polycarpa</u> (Torr.) Wats.
desert shadscale	<u>Atriplex confertifolia</u> (Torr. + Frem.) Wats.
Douglas-fir	<u>Pseudotsuga menziesii</u> (Mirb.) Franco
Douglas rabbitbrush	<u>Chrysothamnus viscidiflorus</u> (Hook.) Nutt.
dropseed	<u>Sporobolus</u> R. Br.
elm	<u>Ulmus</u> L.
ephedra	<u>Ephedra</u> L.
Eriogonum	<u>Eriogonum</u> Michx.
Fendler sandwort	<u>Arenaria fendleri</u> Gray
Fendler threeawn	<u>Aristida fendleriana</u> Steud.
field bindweed	<u>Convolvulus arvensis</u> L.
fourwing saltbush	<u>Atriplex canescens</u> (Pursh) Nutt.
foxtail barley	<u>Hordeum jubatum</u> L.
Fremont cottonwood	<u>Populus fremontii</u> Wats.
fringed sagebrush	<u>Artemisia frigida</u> Willd.
galleta	<u>Hilaria jamesii</u> (Torr.) Benth.
Gambel oak	<u>Quercus gambellii</u> Nutt.
Gardner saltbush	<u>Atriplex gardneri</u> (Moq.) Standl.
goldenrod	<u>Solidago</u> L.
gooseberry	<u>Ribes</u> L.
green ash	<u>Fraxinus pennsylvanicus</u> Marsh.
Green's lupine	<u>Lupinus greenii</u> A. Nels.
green needlegrass	<u>Stipa viridula</u> Trin.
groundcherry	<u>Physalis</u> L.
halogeton	<u>Halogeton glomeratus</u> (Bieb.) Mey.
hard fescue	<u>Festuca ovina</u> (L.) Koch.
hairy grama	<u>Bouteloua hirsuta</u> Lag.
heath aster	<u>Aster ericoides</u> L.
honeysuckle	<u>Lonicera</u> L.
Hooker sandwort	<u>Arenaria hookeri</u> Nutt.
Indian ricegrass	<u>Oryzopsis hymenoides</u> (R. + S.) Ricker
intermediate wheatgrass	<u>Agropyron intermedium</u> (Host) Beauv.
Japanese brome	<u>Bromus japonicus</u> Thumb.
junegrass	<u>Koeleria cristata</u> Pers.
juniper	<u>Juniperus</u> L.

Common Name

Scientific Name

Kentucky bluegrass	<u>Poa pratensis</u> L.
lambsquarters	<u>Chenopodium album</u> L.
Letterman needlegrass	<u>Stipa lettermanii</u> Vasey
little bluestem	<u>Andropogon scoparius</u> Michx.
lodgepole pine	<u>Pinus contorta</u> Dougl.
Louisiana sagebrush	<u>Artemisia ludoviciana</u> Nutt.
maple	<u>Acer</u> L.
milkvetch	<u>Astragalus</u> L.
mint	<u>Mentha</u> L.
mountain-ash	<u>Sorbus</u> L.
mountain brome	<u>Bromus carinatus</u> H. + A.
mountain maple	<u>Acer glabrum</u> Torr.
mountainmahogany	<u>Cercocarpus</u> H.B.K.
mullein	<u>Verbascum</u> L.
mutton bluegrass	<u>Poa fendleriana</u> (Steud.) Vasey
needleandthread	<u>Stipa comata</u> Trin. + Rupr.
oak	<u>Quercus</u> L.
oat	<u>Avena</u> L.
orchardgrass	<u>Dactylis glomerata</u> L.
Pacific giant wildrye	<u>Elymus cinereus</u> Scribn. + Merr.
paloverde	<u>Cercidium</u> Tulasne.
perennial ryegrass	<u>Lolium perenne</u> L.
phacelia	<u>Phacelia</u> Juss.
pigweed	<u>Amaranthus</u> L.
pine	<u>Pinus</u> L.
pinyon pine	<u>Pinus edulis</u> Englem.
ponderosa pine	<u>Pinus ponderosa</u> Laws.
prairie sandreed	<u>Calamovilfa longifolia</u> (Hook.) Scribn.
pricklypear	<u>Opuntia mill.</u>
pubescent wheatgrass	<u>Agropyron trichophorum</u> (Link) Richt.
quaking aspen	<u>Populus tremuloides</u> Michx.
rabbitbrush	<u>Chrysothamnus</u> Nutt.
red alder	<u>Alnus rubra</u> Bong.
ring muhly	<u>Muhlenbergia torreyi</u> (Kunth) Bush
rose	<u>Rosa</u> L.
Russian wildrye	<u>Elymus sibiricus</u> L.
Russian olive	<u>Elaeagnus angustifolia</u> L.
Russianthistle	<u>Salsola kali</u> L.
rye	<u>Secale cereale</u> L.
sainfoin	<u>Onobrychis</u> Scop.
Sandberg bluegrass	<u>Poa sandbergii</u> Vasey
sand dropseed	<u>Sporobolus cryptandrus</u> (Torr.) Gray
sand lovegrass	<u>Eragrostis trichodes</u> (Nutt.) Wood
scotch pine	<u>Pinus sylvestris</u> L.
scrub oak	<u>Quercus</u> L.

Common Name	Scientific Name
scurfpea	<u>Psoralea</u> L.
serviceberry	<u>Amelanchier</u> Medic.
shadscale	<u>Atriplex confertifolia</u> (Torr. + Frem) Wats.
Siberian elm	<u>Ulmus pumila</u> L.
sideoats grama	<u>Bouteloua curtipendula</u> (Michx.) Torr.
silver buffaloberry	<u>Shepherdia argentea</u> (Pursh) Nutt.
silver sagebrush	<u>Artemisia cana</u> Pursh.
skunk bush	<u>Rhus trilobata</u> Nutt.
slender wheatgrass	<u>Agropyron trachycaulum</u> (Link) Malte
small burnet	<u>Sanguisorba</u> L.
small soapweed	<u>Yucca glauca</u> Nutt.
smooth brome	<u>Bromus inermis</u> Leyss.
snakeweed	<u>Guttierrezia</u> Lag.
snowberry	<u>Symphoricarpos</u> Duhamel
snowbrush ceanothus	<u>Ceanothus velutinus</u> Hook.
spikesedge	<u>Eleocharis</u> R. Br.
spiny hopsage	<u>Grayia spinosa</u> (Hook.) Moq.
streambank wheatgrass	<u>Agropyron riparium</u> Scribn. + Smith
subalpine fir	<u>Abies lasiocarpa</u> (Hook.) Nutt.
summercypress	<u>Kochia scoparia</u> (L.) Schrad.
sunflower	<u>Helianthus</u> L.
swallen bluegrass	<u>Poa glaucifolia</u> Scribn. + Williams
sweetclover	<u>Melilotus</u> Juss.
tall fescue	<u>Festuca arundinacea</u> Schreb.
tall wheatgrass	<u>Agropyron elongatum</u> (Host.) Beauv.
tamarisk	<u>Tamarix</u> L.
tenpetal mentzelia	<u>Mentzelia decapetala</u> (Pursh) Urb. + Gilg.
thickspike wheatgrass	<u>Agropyron dasystachyum</u> (Hook.) Scribn.
threeawn	<u>Aristida</u> L.
timothy	<u>Phleum pratense</u> L.
Utah juniper	<u>Juniperus osteosperma</u> (Torr.) Little
Utah snowberry	<u>Symphoricarpus utahensis</u> (Rydb.) A. Nels.
vetch	<u>Vicia</u> L.
western wheatgrass	<u>Agropyron smithii</u> Rydb.
western white pine	<u>Pinus monticola</u> Douge.
wheatgrass	<u>Agropyron</u> Gaertn.
white sweetclover	<u>Melilotus alba</u> Desr.
Whitman bunchgrass	
Whitman wheatgrass	
wild lettuce	<u>Lactuca</u> L.
willow	<u>Salix</u> L.

Common Name	Scientific Name
winterfat	<u>Eurotia lanata</u> (Pursh) Moq.
wolfberry	<u>Lycium</u> L.
yellow sweetclover	<u>Melilotus officinalis</u> (L.) Lam.
yucca	<u>Yucca</u> L.

APPENDIX C
Reclamation Laws

The acceleration of mineral-related exploration and development in the western states in the past decade, together with concern for environmental protection and the future uses of surface-mined lands, has led to the passage of state and federal laws controlling surface mining and reclamation. Of the 13 states included in this Atlas, only Arizona has no state reclamation law; and in Arizona the only surface coal mines are on Indian lands, which would not be subject to state regulations in any case. There are significant variations in state reclamation laws regarding required procedures and the minerals subject to the laws. In general, state reclamation acts establish a permitting agency, require the submission of a reclamation plan and posting of a performance bond by the permit applicant, and set out requirements for the treatment of topsoil, backfilling and regrading of mined areas, preservation of water quality, and revegetation of spoil areas.

Basically, the laws empower an administrative body to issue permits and enforce their conditions. In order to acquire a mining permit, applicants are required to provide information on the characteristics of the potential mine site, including land use, soils, vegetation, topography, climate and hydrology. A detailed mining and reclamation plan is also required, as well as a performance bond, which ensures that the proposed reclamation procedures are carried out. Typically, the following reclamation procedures are required:

- backfilling and recontouring of spoils to either original or to gently undulating contours,
- burying of all acid or toxic spoil materials, and protection of water quality,
- revegetation with plant communities capable of self regeneration and plant succession that will support a post-mining land use equal to or higher than the pre-mining use.

The predominant land uses in surface-mining areas of the western states are dryland farming, livestock grazing, and wildlife habitat. Accordingly, reclamation acts in the western states emphasize regrading and revegetating with species either indigenous to the area or of superior quality for livestock grazing. For summaries of various laws pertaining to reclamation see Reference (81).

Although most state laws are similar in scope and objectives, there are some fundamental differences among the various states. New Mexico and North Dakota regulate coal only, while Montana regulates coal and uranium under the same statute. Colorado, Idaho, South Dakota, Utah and Wyoming regulate all

minerals except oil and gas. Some states, such as New Mexico, Idaho, and Utah, have merely created a regulatory process for approving mining and reclamation plans, thereby giving mining applicants and the regulatory administrators considerable freedom to design reclamation plans. Other states, such as Colorado, Montana, and Wyoming, have established specific and extensive performance standards regarding spoil treatment, protection of water quality, and revegetation procedures.

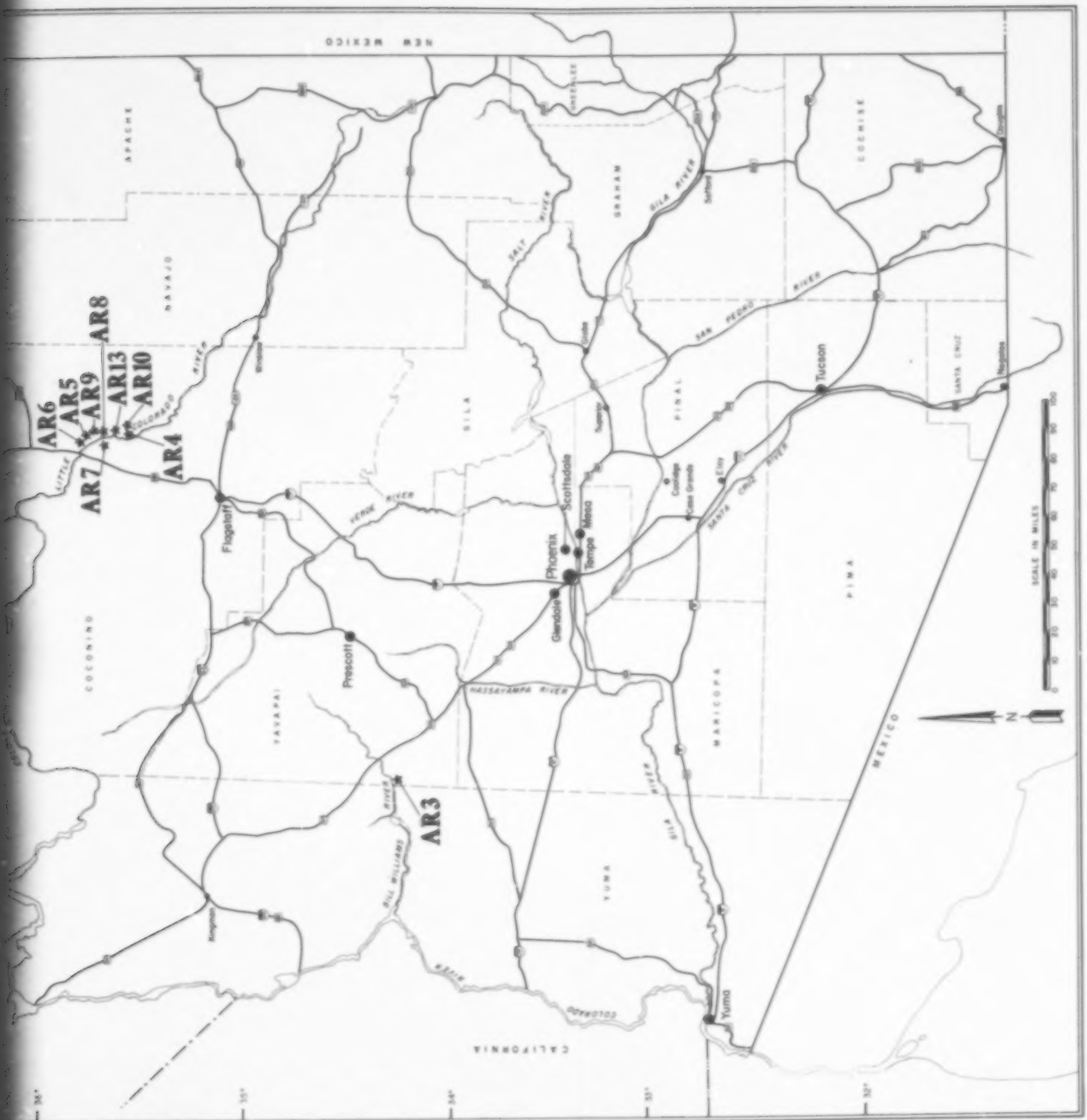
In addition to these state statutes, the recently enacted federal Surface Mining Control and Reclamation Act will regulate all coal surface mining and reclamation. This Act contains performance standards, and allows the denial of mining permits where reclamation is not feasible or where mining could result in significant damage to other historic, cultural, scientific and aesthetic values and natural systems, or where mining would be incompatible with existing land-use plans or programs. Regulations for implementation of this law are currently being promulgated within the Office of Surface Mining and Enforcement, Department of the Interior.

Reclamation acts in the western states are of comparatively recent origin; none was in force prior to 1969, and most were not enforced before the early 1970's. Consequently, there is little long-term experience with surface-mine reclamation in the western states, and, although many operating mines in the states covered in this atlas are actively reclaiming their mined lands, it is difficult to draw any general conclusions regarding the success of mine reclamation in the west. The major problems associated with mine reclamation in these states are the lack of sufficient rainfall and the lack of topsoil, particularly in New Mexico, Arizona, Colorado, Wyoming, Montana, Idaho, and Utah. Segregation of topsoil and irrigation can greatly increase reclamation costs, and, as yet, it cannot be determined whether these procedures will lead to the permanent establishment of native vegetation within acceptable time frames. It is also not yet clear as to whether the reclamation procedures currently used are optimal from the standpoint of wildlife.

APPENDIX D: LIST OF MAPS

Caption

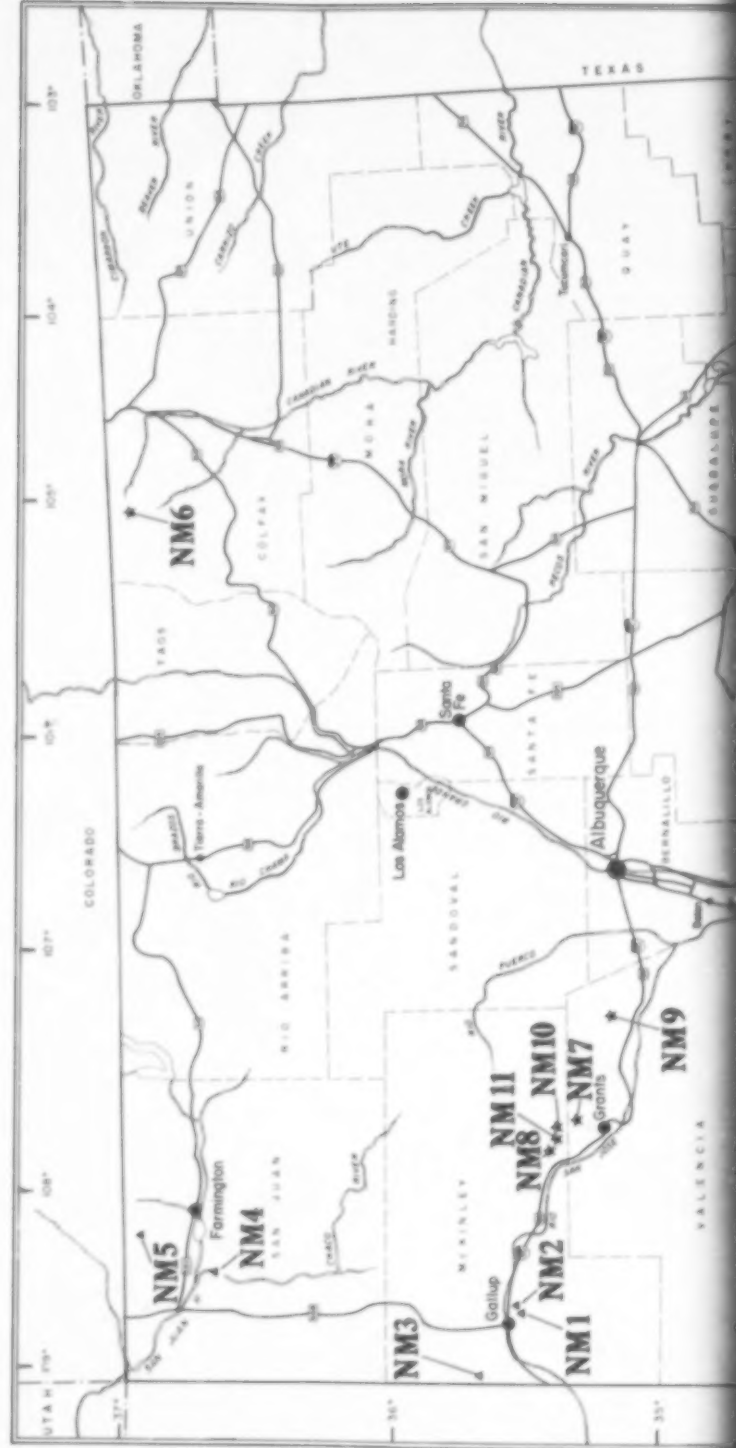
Southwestern Region	Land surfaces in excess of 10 acres mined for Coal, Uranium, or Phosphate, prior to 1976 in the State of Arizona	D-2
	Land surfaces in excess of 10 acres mined for Coal, Uranium, or Phosphate, prior to 1976 in the State of New Mexico	D-3
Northern Great Plains Region	Land surfaces in excess of 10 acres mined for Coal, Uranium, or Phosphate, prior to 1976 in the State of Colorado	D-4
	Land surfaces in excess of 10 acres mined for Coal, Uranium, or Phosphate, prior to 1976 in the State of Montana	D-5
	Land surfaces in excess of 10 acres mined for Coal, Uranium, or Phosphate, prior to 1976 in the States of North Dakota and South Dakota	D-6
Far Western and Intermountain Regions	Land surfaces in excess of 10 acres mined for Coal, Uranium, or Phosphate, prior to 1976 in the State of Wyoming	D-7
	Land surfaces in excess of 10 acres mined for Coal, Uranium, or Phosphate, prior to 1976 in the States of Idaho, Oregon, Utah, and Washington	D-8

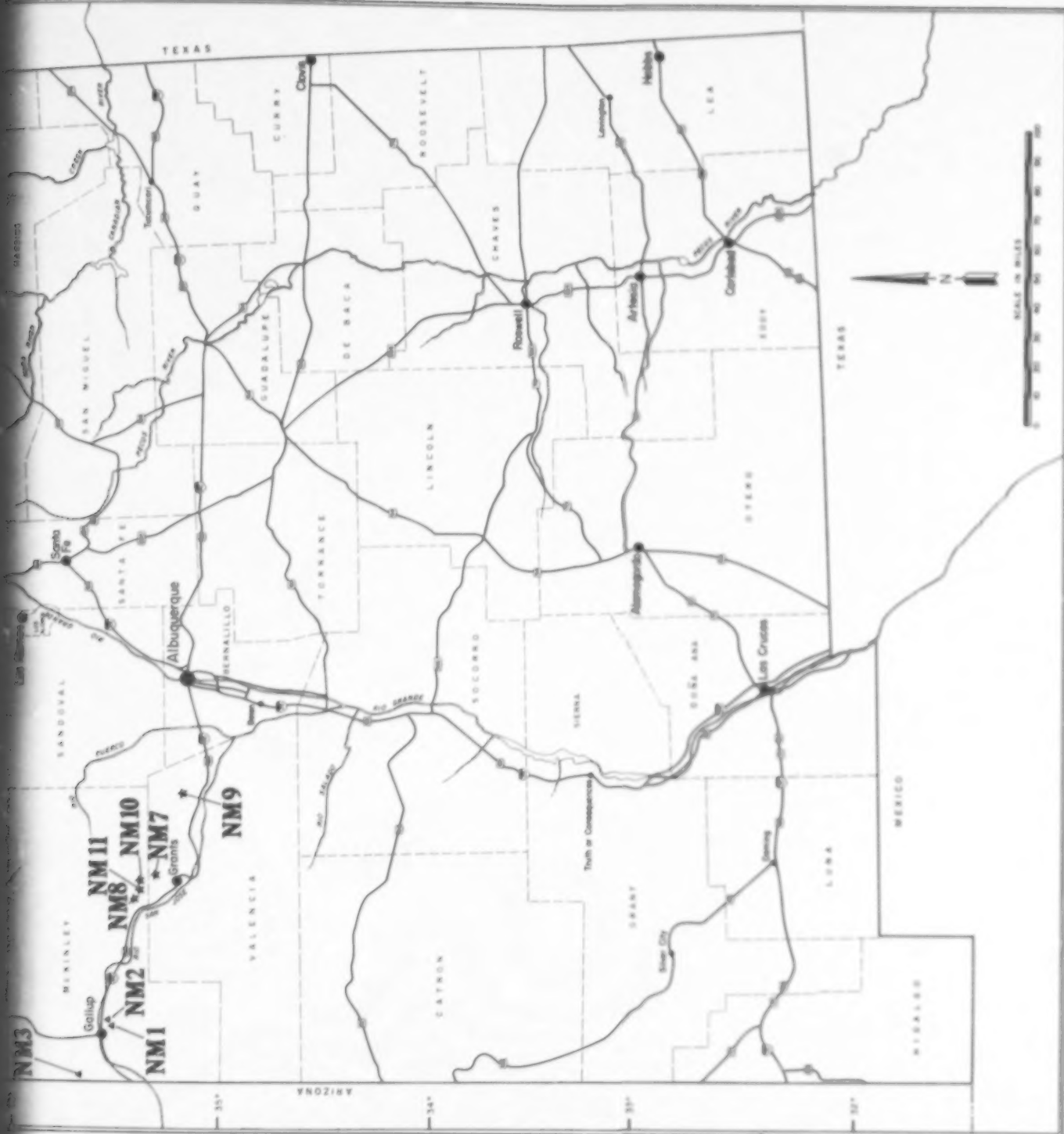


Land surfaces in excess of 10 acres
mined for Coal(▲), Uranium(★),
or Phosphate(#), prior to 1977
in the State(s) of

NEW MEXICO

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FOR WESTERN ENERGY AND LAND USE TEAM
UNITED STATES FISH AND WILDLIFE SERVICE





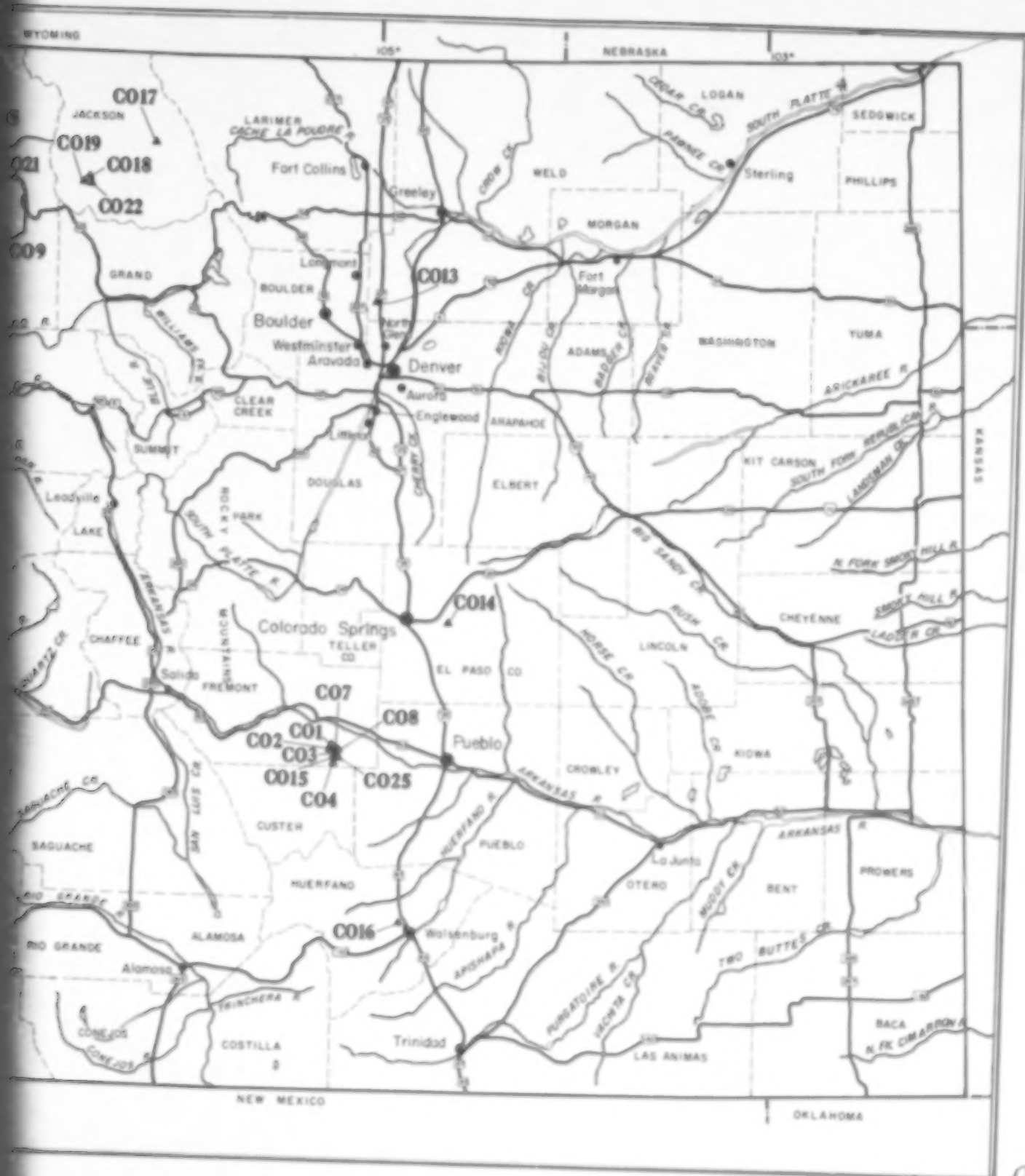
Land surfaces in excess of 10 acres
mined for Coal(▲), Uranium(★),
or Phosphate(●), prior to 1977
in the State(s) of

COLORADO

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A



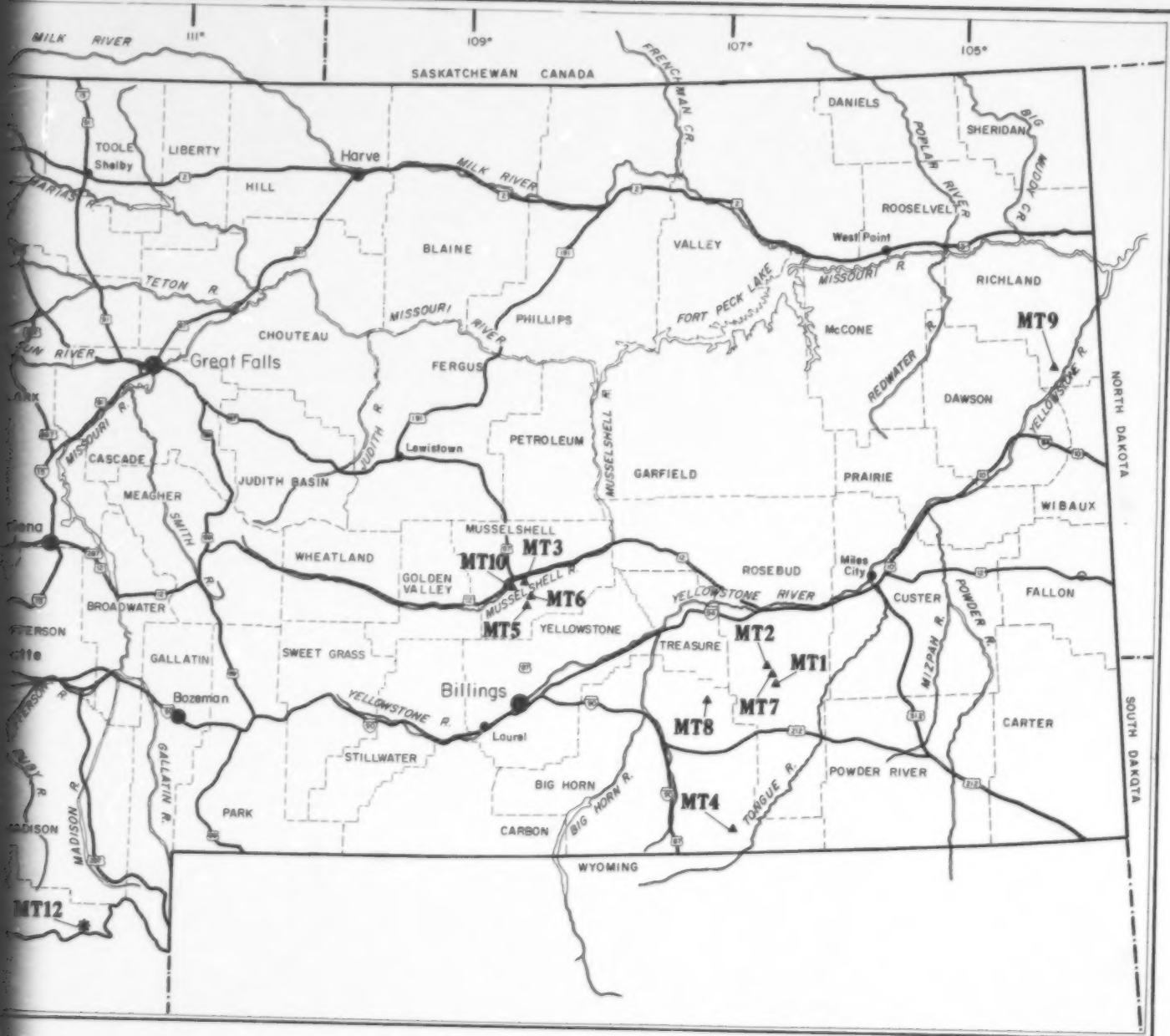
B

Land surfaces in excess of 10 acres
mined for Coal(▲), Uranium(★),
or Phosphate(●), prior to 1977
in the State(s) of

MONTANA

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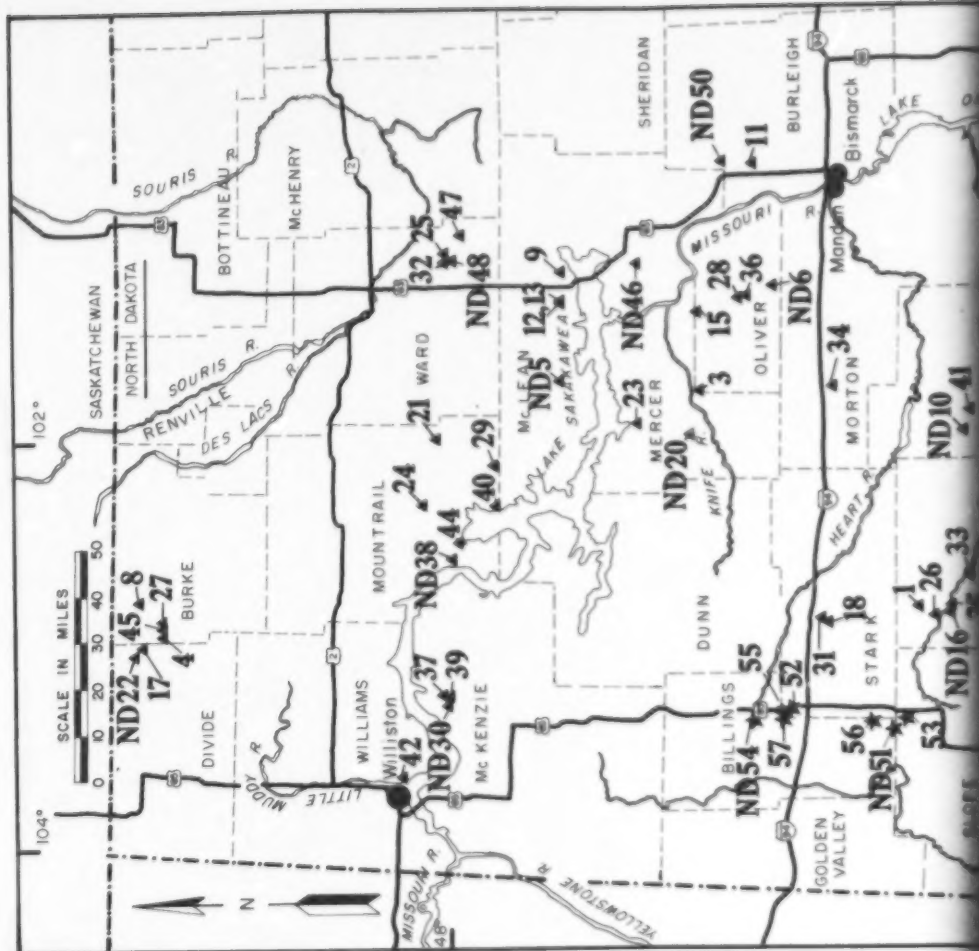


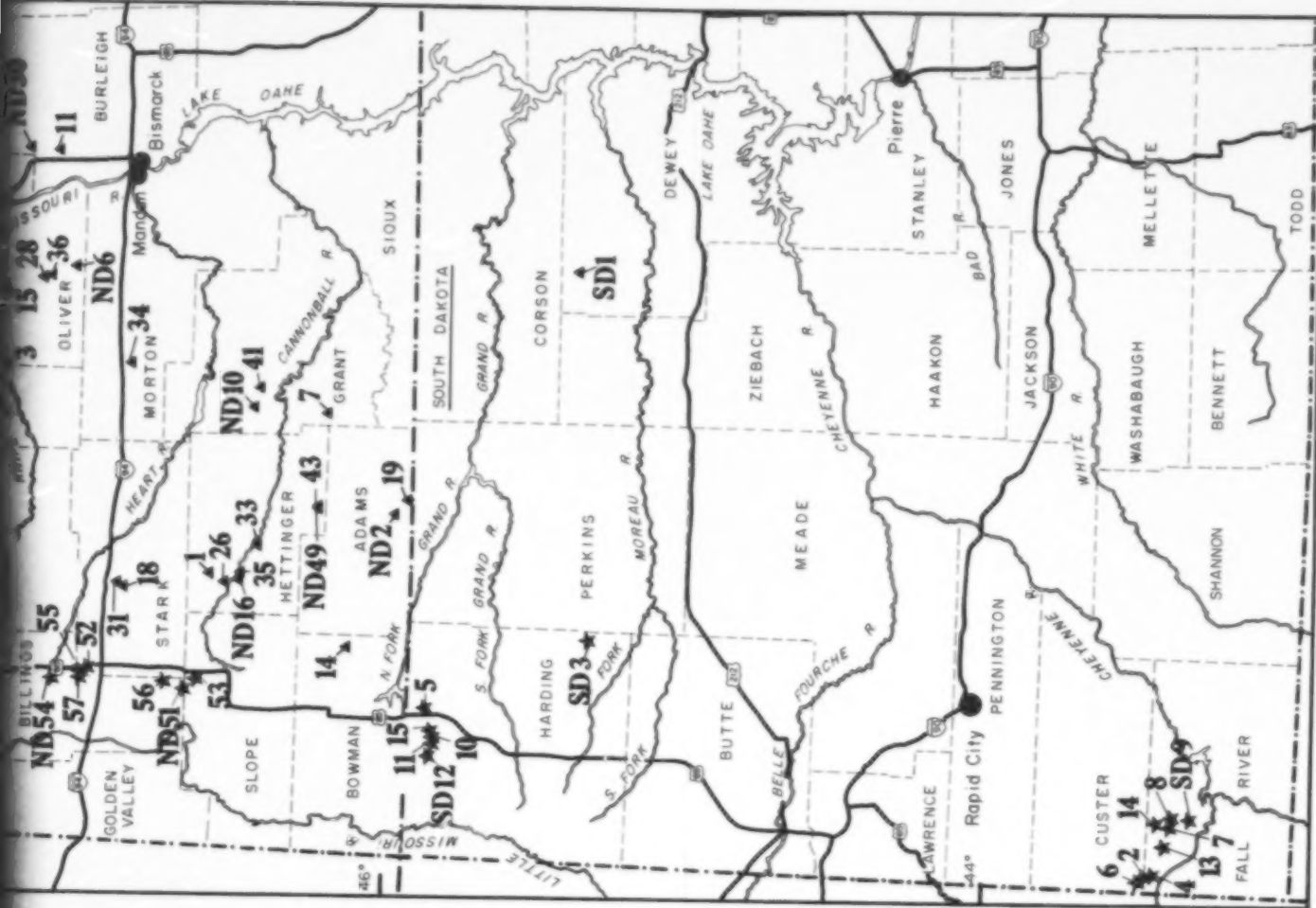


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B
CP 2-

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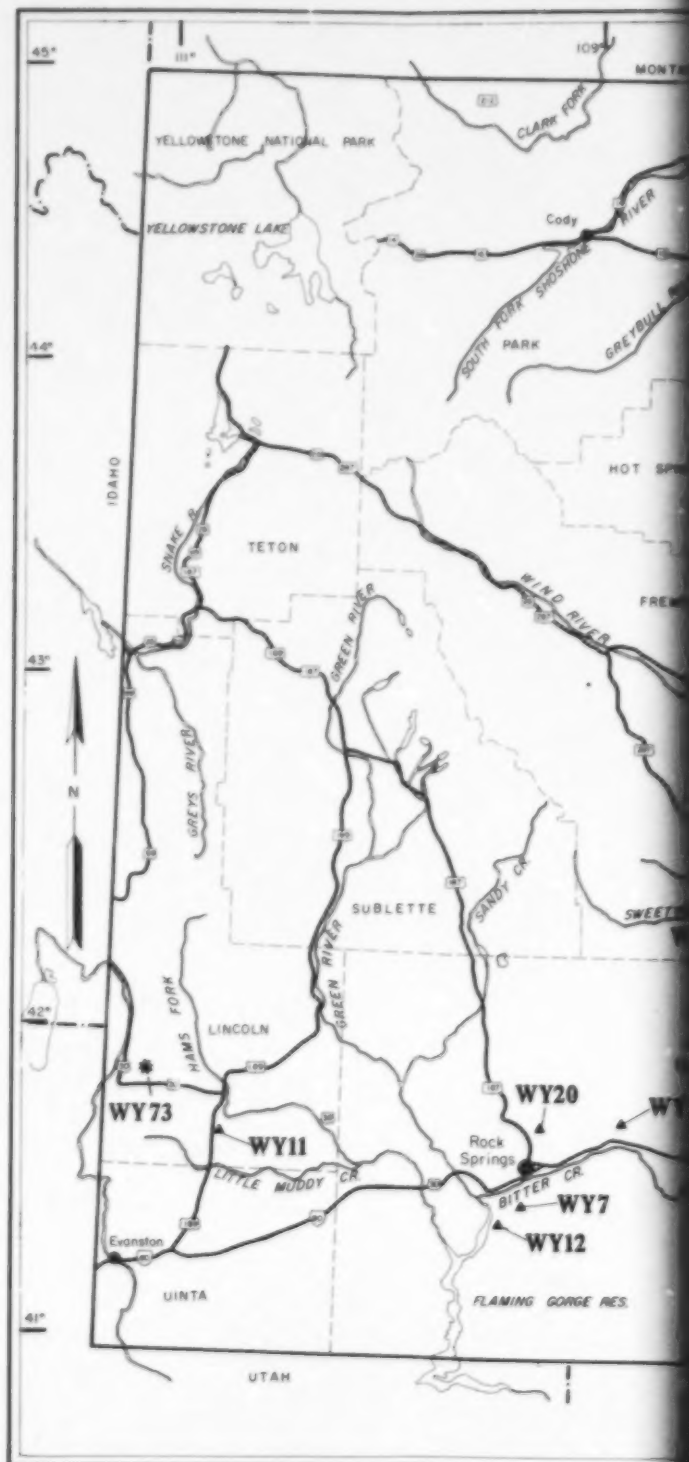




Land surfaces in excess of 10 acres
mined for Coal(▲), Uranium(★),
or Phosphate(●), prior to 1977
in the State(s) of

WYOMING

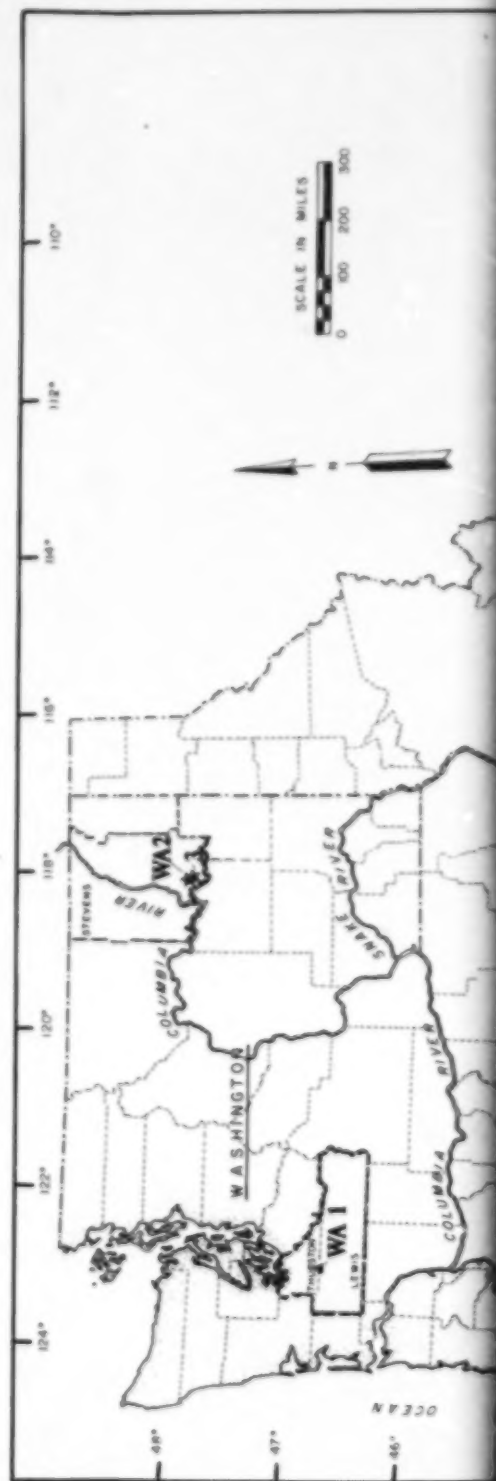
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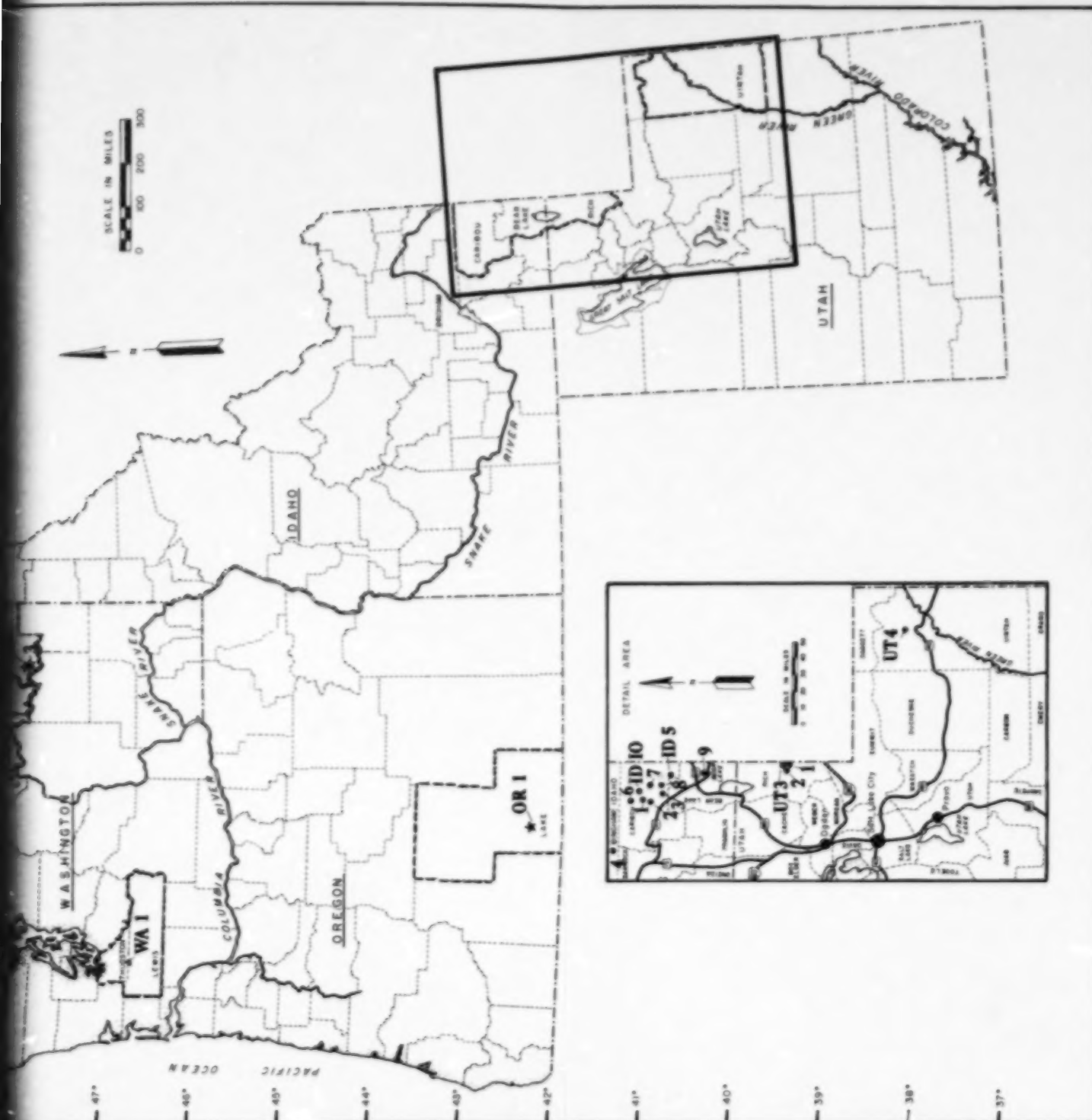


Land surfaces in excess of 10 acres
mined for Coal(▲), Uranium(★),
or Phosphate(✱), prior to 1977
in the State(s) of

**IDAHO, OREGON,
UTAH, WASHINGTON**

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U. S. Department of the Interior

Fish and Wildlife Service

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

